Expert Report of Greg Karras
Communities for a Better Environment (CBE)
2 February 2015

Regarding the

Phillips 66 Company Propane Recovery Project
Recirculated Final Environmental Impact Report (RFEIR)
Released in January 2015 by the Contra Costa County
Department of Conservation and Development
State Clearinghouse #2012072046
County File #LP12-2073

I, Greg Karras, declare and say:

1. I reside in unincorporated Marin County and am employed as a Senior Scientist for Communities for a Better Environment (CBE). My duties for CBE include technical research, analysis, and review of information regarding industrial health and safety investigation, pollution prevention engineering, pollutant releases into the environment, and potential effects of environmental pollutant accumulation and exposure. My qualifications, curriculum vitae, and publications list were provided with my previous reports on the project and its draft and recirculated draft Environmental Impact Report (DEIR, and RDEIR, respectively).[1]

2. I have reviewed the Phillips 66 Company 'Propane Recovery Project' (project) Recirculated Final Environmental Impact Report (RFEIR) and reassert my previous comments as they remain valid and have not been addressed in the RFEIR. In its attempt to rationalize its decision not to analyze or even disclose the changes in oil feedstock that will be necessary to implement the project, and despite the potential pollution and hazard impacts from those feedstock changes, the RFEIR repeats the unsupported assertion that sufficient propane and butane (LPG) is recoverable in the project baseline. The RFEIR does not include any publicly verifiable data supporting this assertion, or consider evidence provided by the public indicating that a change in the refinery's oil feedstock

[1] *See* esp. my reports dated 4 September 2013 report (Karras Rodeo Report-1) and 5 December 2014 (Karras Rodeo Report-2). *See* also my 7 January 2014 Supplemental Evidence–B (CBE Supp-B), 14 January 2014 Supp. Evidence–C (CBE Supp-C), 20 January 2014 Supp. Evidence–D (CBE Supp-D; co-authored with Roger Lin), and 24 November 2014 report regarding the 'Rail Spur Extension and Crude Unloading Project' (Karras Rail Spur Report). Each of these documents and its attachments was provided to Contra Costa County and is incorporated herein.

will be necessary to provide enough LPG for the proposed project.[2] However, the RFEIR does more specifically delimit the *type* of measurements it purports to rely upon for its LPG baseline estimate. My review of the project and RFEIR reported herein focuses on the adequacy of its project description and analysis of potential environmental impacts with respect to this new information on the type of measurements that the RFEIR relies upon for that baseline analysis. My opinions on these matters and the basis for these opinions are stated in this report.

3. According to the RFEIR, the type of data it used to estimate LPG recoverable in the project baseline was limited to project design data. It relies on measurements during August 2011 that Phillips 66 used as the project "design basis" for its conclusion that "the existing Refinery baseline condition had and has sufficient propane and butane feedstocks to support the extraction rates of propane and butane sought by Phillips 66 for the proposed Project." (RFEIR at 2-3, 2-5, 2-6.) The RFEIR mentions other data, but in response to CBE's previous comment that the RDEIR was wrong to include those 2013 data in the baseline and the refinery had already begun to change its feedstock by then (RFEIR at 3.2-77), the RFEIR confirms this reliance on the 2011 design basis data:

> "[T]he actual sampling and measurements of propane and butane in the refinery fuel gas (RFG) at the Refinery that was used as the basis for the design and permit limit of 14,500 barrels per day (BPD) occurred in 2011, not 2013 as the commenter appears to suggest. The sampling data for year 2013 is presented in the RDEIR for informational purposes and does not represent the baseline for the proposed Project … ." (RFEIR at 3.2-128; RTC B9-25; emphasis added.)

4. 'Design basis' means the conditions that are taken into account when designing a facility or product.[3] Those include anticipated post-project conditions. 'Project baseline' means existing conditions, not post-project conditions. Equating data representing design basis conditions with those representing current baseline conditions is a logical fallacy, but the RFEIR does exactly that. This is a clear error in its project description.

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[2] *See* Karras Rodeo Report-1; CBE Supp-C; CBE Supp-D; Karras Rodeo Report-2; Karras Rail Spur Report; and the comments and reports of Drs. Fox and Pless in this matter.
[3] *See* Black's Law Dictionary (http://thelawdictionary.org/design-basis/#ixzz3QRYQrkhw).

5. Future conditions that are taken into account when designing facilities to make refined products include, among others, potential post-construction changes in operation, production, and environmental health and safety due to changes in facility oil feedstock.[4]

6. The refinery's oil feedstock will almost certainly change during the proposed project's operating term. This is shown by processing data, dwindling current crude supplies, the company's plans to replace them with 'advantaged crudes' that include diluent/bitumen ('dilbit') blends from Canada and shale oils from the Bakken region, and its current wharf and throughput expansion and rail spur proposals that would enable those plans.[5] Indeed, while it errs in disputing the relevance of this change in feedstock, the RFEIR does not dispute the *potential* for this oil switch.

7. Phillips 66 has a strong incentive to design its project based on measurements taken when it was processing samples of feedstock blends similar to those it could process during the project's operating life. Not to do so would risk capital on a potentially underproductive or stranded asset. For example, LPG yields from delayed coking—a major producer of LPG in this refinery—vary greatly when coker feedstock is derived from different crude oils.[6] Even when detailed composition data are available for each oil in a new feedstock blend, predictions about the behavior of the *blend* during actual conversion processing remain limited and uncertain until the complex interactions of blend-specific components are tested directly in practice.[7]

8. The volume and country of origin of each oil shipment imported and processed by each refinery in the U.S. each month, as well as the density and sulfur content of each such shipment that is crude oil, is reported publicly by the U.S. Energy Information Administration (EIA). These EIA data for the period from 1 January 2006 through 30 November 2014 are appended hereto as Attachment K3-1.

9. During the five months through August 2011, when the RFEIR states that Phillips 66 took the measurements of the refinery that were used as the design basis for the

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[4] *See* Meyers, 1986; Speight, 1991; Karras, 2010; Bredeson et al., 2010; UCS, 2011; Abella and Bergerson, 2012; Brandt, 2012; API, 2009; CSB, 2013 *in* Karras Rodeo Report-1 attachments.
[5] CBE and others provided abundant evidence for each of these points: *see* Karras Rodeo Report-1; Karras Rodeo Report-2; Karras Rail Spur Report, and the comments of Drs. Fox and Pless.
[6] *See* Meyers, 1986 *in* Karras Rodeo Report-1 and attachments thereto. *See* esp. Karras Rodeo Report-1 at Table 2, page 7 and Meyers tables 7.1-2 and 7.1-6.
[7] Speight, 1991 at 301-305 *in* Karras Rodeo Report-1 attachments.

project (April–August), the refinery received ≈ 1.5 million barrels of 40.1 ºAPI gravity, 0.61 wt. % sulfur crude oil from Russia for processing in four consecutive shipments. (Att. K3-1.) The refinery did not normally run this particular crude oil. This 1.5 million barrels from April–August 2011 represents only the second time the refinery received this particular crude for processing,[8] the largest volume of that crude it ever processed in a year, and the lowest average API gravity (lightest) foreign crude imports it received in any five-months, during 2006 through November 2014. (*Id.*)

10. A report by Sandu and Wright entitled 'Innovative Solutions for Processing Shale Oils' that was published in *Hydrocarbon Processing* during 2013 is appended hereto as Attachment K3-2, and EIA's May 2014 report entitled *U.S. Crude Oil Production Forecast–Analysis of Crude Types* is appended hereto as Attachments K3-3. These reports suggest Bakken crude oil averages ≈ 0.3 wt. % sulfur and 40.8 ºAPI (Att. K3-2) with the density of most Bakken crude oils ranging from ≈ 40–45 ºAPI (Att. K3-3). The 40.8 ºAPI and 0.3 wt. % sulfur averages for Bakken compare to the density (40.1 ºAPI) and sulfur content (0.6 wt. %) of the Russian crude received by Phillips' San Francisco Refinery while it was collecting the measurements it used as the design basis for the project. In terms of these bulk properties, the Russian crude processed by the refinery could be called a 'Bakken look-alike' crude.

11. Bay Area Air Quality Management District (BAAQMD) Application No. 25608 by Phillips 66, dated 31 July 2013, for 'Phase III' of its proposed expansion of wharf capacity to replace dwindling San Joaquin Valley Pipeline (SJVP) crude deliveries to the refinery with waterborne oils from different sources is appended hereto as Attachment K3-4. A chart in this application indicates that the monthly average sulfur content of the refinery crude slate during normal operation from 2004–August 2011 ranged from ≈ 1.8–2.7 wt. %. (Att. K3-4.) The 1.5 million barrels of 0.6 wt. % sulfur crude that the refinery imported from Russia when it was taking the measurements for its project design basis was substantially lower in sulfur than its current crude slate as reported by Phillips 66. At 40.1 ºAPI, this import crude also was substantially lighter than the average density of the refinery's crude slate (≈ 23 ºAPI) estimated during 2008 by previously work.[9] Lighter crude oils, such as this 40.1 ºAPI imported crude and Bakken crude, can be

[8] The only other time during 2006–Nov 2014 was when the San Francisco Refinery received two shipments of Russian crude with these properties in June and July 2010 (Att. K3-1), possibly for a pre-test or previous test run, in the same season a year earlier.

[9] *See* Karras Rodeo Report-1 at 8 (average density in 2008 ≈ 915–918 kg/m^3).

expected to yield substantially more LPG per barrel from distillation, on average, than heavy crude oils, such as those processed at the refinery in the project baseline.

12. Data reported by the industry for dilbit crude streams that are produced in Canada and available for U.S. import are appended hereto as Attachment K3-5. For whole crude, the most recent five-year average densities and sulfur contents reported for these Canadian dilbits ranged from 923–929 kg/m^3 (21.8–20.8 ºAPI) and from 3.5–3.9 wt. %, respectively. (Att. K3-5.) Individual shipments of these dilbits could be expected to range somewhat more widely than these five-year averages.

13. During 2011, the refinery received for processing 153,000 barrels of Canadian crude with a density *and* sulfur content similar to those reported for the Canadian dilbits or denser diluent/bitumen blends (< 24 ºAPI *and* ≥ 2.5 wt. % sulfur). (Att. K3-1.) This 2011 shipment represents a much larger volume of Canadian crude with that range of density and sulfur than the refinery reported receiving and processing in any shipment or any year during January 2006 through November 2014, the first shipment of such crude the refinery reported processing since at least 2005, and the only time since then when the refinery reported processing that crude in this period until 2013. (*Id.*) The only other year since at least 2005 when the refinery received dilbit for processing was 2013 (*Id.*), when, the RFEIR states, Phillips took additional measurements to confirm its project design.

14. Refinery distillation of LPG-rich diluent and cracking of bitumen contained in dilbits can result in LPG yields substantially greater than those from processing the refinery's current baseline crude slate.[10]

15. The refinery has multiple oil storage tanks among which it transfers oils before processing them.[11] Like other refiners, Phillips 66 uses this interconnected storage capacity to advance its processing and business objectives by storing the oils it has received and controlling the timing and amount of each oil it blends into the total feedstock stream processed at the refinery. Thus, the company could have stored the crude it imported from Russia during April–August 2011 for processing in August, when the RFEIR states that the company took the measurements supporting its design basis for the project. Moreover, like other oil companies, Phillips 66 could be expected to measure

[10] *See* my previous comments and expert reports and those of Drs. Fox and Pless.
[11] *See* Attachment K3-4; *see* also BAAQMD 2013 *in* Karras Rodeo Report-1 attachments.

many 'test' oil blends before committing to a major capital project such as this project.[12] In fact, not to do so could risk an unproductive capital investment due to complex and unpredictable interactions of constituents in the new oil blends during future processing, and, from a process design or business perspective, might be considered irresponsible. However, such tests of new oil feedstock blends that appear necessary to establish a valid design basis for the project do not, by definition, represent the typical current baseline feedstock processing conditions.

16. The County could have chosen to estimate the amounts of propane and butane that are recoverable during typical current (2010–2012) conditions based on valid, publicly reported, independently verifiable data. Had it chosen to do so, the County could have required that Phillips 66:

- report each discrete process stream from which LPG would be recovered;
- demonstrate the amounts of LPG it is feasible to recover from each such stream;
- report each discrete measurement of oil feedstock, fuel gas production, and LPG stream quality and quantity in the baseline, including date and time of sampling;
- demonstrate that measurements taken when oil feedstock, processing, or both deviated from typical current baseline conditions (such as in tests done to design the project) are not lumped in with and will not skew the baseline sample data;
- compare the resultant validated baseline data with the proposed project design basis data to support its analysis of potential project impacts, and
- report the supporting data for that comparison and analysis in the EIR.

Unfortunately, the County has not done so, and its the RFEIR has not included, or otherwise provided the public access to, any of these data.

17. Excerpts from a 2014 CEQA review by the City of Richmond for the Chevron Richmond Refinery 'Modernization' Project are appended hereto as Attachment K3-6. The City's EIR for that project included data for baseline as well as anticipated post-project crude and gas oil feedstock density, sulfur content, distillation properties, and feedstock processing rates for processes in the Richmond refinery. (Att. K3-6.) Further, the City of Richmond's CEQA process provided for public access to detailed data, including but not limited to sample analysis results for discrete measurements of various toxic metals in the crude feedstock blends processed by the Richmond refinery as well as the gas oil streams processed by Richmond refinery conversion processing units. (*Id.*)

[12] Those test samples may have included domestically produced Bakken and bitumen, which would not be reported by EIA as foreign imports.

This evidence suggests that the County could choose to include the data necessary to support independently verifiable analysis of project changes in oil feedstock quality, oil feedstock quantity, and process rates, in the EIR for this Phillips 66 project.

18. An 'Incomplete Letter' issued on 22 August 2014 by the Bay Area Air Quality Management District (BAAQMD) to Phillips 66 regarding its 'Phase III' wharf expansion proposal is appended hereto as Attachment K3-7. Among other outstanding questions regarding Phillips' proposal, BAAQMD found that its application to replace additional current SJVP crude supplies to the refinery with waterborne crude oils from different sources was incomplete because "detailed crude oil information pre and post project" is needed. (Att. K3-7.) This evidence further suggests that the County could choose to include baseline and anticipated post-project oil feedstock quality data in the EIR.

19. In my opinion: Phillips 66 has both motive and opportunity to measure samples of the new oil feedstock the company plans to, proposes to, and is investing capital to process at the refinery while the proposed project would be operational. The conclusion in the RFEIR that this 'design basis' data represents current baseline conditions is illogical and its failure to disclose or analyze the baseline, post-project, and design basis feedstock data renders its illogical conclusion unsupported by any evidence. These clear errors in the RFEIR's project description ignore the reasonable potential, documented in previous comments, that significant feedstock-driven impacts on environmental health, safety, and climate protection could result from the project.

20. I have given my opinions on these matters based on my knowledge, experience and expertise and the data, information and analysis discussed in this report.

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I declare under penalty of perjury that the foregoing is true of my own knowledge, except as to those matters stated on information and belief, and as to those matters, I believe them to be true.

Executed this **_2nd_** day of February 2015 at Oakland, California

Greg Karras

Company Level Imports Explanatory Notes

Notice: Ongoing analysis of imports data to the Energy Information Administration reveals that some imports are not correctly reported on Form EIA-814 "Monthly Imports Report". Contact with the companies provides sufficient information for EIA to include these imports in the data even though they have not provided complete reports on Form EIA-814. Estimates are included in aggregate data, but the estimates are not included in the file of Company-Level Imports. Therefore, summation of volumes for PAD Districts 1-5 from the Company-Level Imports will not equal aggregate import totals.

Explanation of Codes Used in Imports Database Files

SURVEY_ID	EIA-814 Survey Form Number for Collecting Petroleum Import Statistics
RPT_PERIOD	Report Period in YYMM Format
R_S_NAME	Importing Company Name
LINE_NUM	Line Number Reported by Importer of Record
PROD_CODE	Internal EIA Product Code
PROD_NAME	Product Name
PORT_CODE	Port Code
PORT_CITY	Port of Entry
PORT_STATE	State Abbreviation
PORT_PADD	Petroleum Administration for Defense District (PADD) for the Port of Entry
GCTRY_CODE	Country Code
CNTRY_NAME	Country Name
QUANTITY	Import Quantity (thousand barrels)
SULFUR	Sulfur Percent
APIGRAVITY	API Gravity
PCOMP_RNAM	Processing Company Name
PCOMP_SNAM	Processing Facility Name
PCOMP_STAT	Processing Company State Code
STATE_NAME	Processing Company State
PCOMP_PADD	Processing Company PADD

RPT_PERIC	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVIT	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STA	STATE_NAME
Dec-06	UNFINISHED OIL	ALGERIA	384	0	0	CHEVRON USA INC	RICHMOND - SECTION 890	CA	CALIFORNIA
Jan-06	CRUDE OIL	BOLIVIA	299	0.02	58.5	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Jan-06	CRUDE OIL	COLOMBIA	345	0.76	28.5	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Mar-06	CRUDE OIL	ARGENTINA	358	0.18	22.1	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Mar-06	CRUDE OIL	COLOMBIA	358	0.16	43.7	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Mar-06	CRUDE OIL	VENEZUELA	350	0.05	32	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Apr-06	CRUDE OIL	COLOMBIA	354	0.7	28.4	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
May-06	CRUDE OIL	VENEZUELA	329	0.05	32	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
May-06	CRUDE OIL	VENEZUELA	348	0.46	39.4	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
May-06	CRUDE OIL	ECUADOR	404	1.3	20.1	CONOCOPHILLIPS	SANTA MARIA	CA	CALIFORNIA
Jun-06	CRUDE OIL	COLOMBIA	336	0.77	29.1	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Jun-06	CRUDE OIL	VENEZUELA	379	0.46	39.4	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Jul-06	CRUDE OIL	ECUADOR	378	1.29	24.2	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Jul-06	CRUDE OIL	MALAYSIA	574	0.05	45.1	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Aug-06	CRUDE OIL	VENEZUELA	350	0.24	41.3	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Sep-06	CRUDE OIL	ECUADOR	360	1.5	23.9	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Sep-06	CRUDE OIL	VENEZUELA	330	0.24	41.3	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Sep-06	CRUDE OIL	VENEZUELA	351	0.53	35.3	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Oct-06	CRUDE OIL	MALAYSIA	549	0.02	45.5	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Dec-06	CRUDE OIL	COLOMBIA	369	0.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Sep-06	FUEL ETHANOL	CHINA, PEOPLE	87	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Mar-06	MOTOR GAS BLI	JAPAN	104	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Feb-06	MOTOR GAS BLI	CANADA	70	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA	CALIFORNIA
Feb-06	MOTOR GAS BLI	KOREA, SOUTH	151	0	0	SHELL OIL PRODUCT	SIGNAL HILL	CA	CALIFORNIA
Sep-06	MOTOR GAS BLI	URUGUAY	31	0	0	SHELL OIL PRODUCT	SIGNAL HILL	CA	CALIFORNIA
Nov-06	MOTOR GAS BLI	PERU	189	0	0	SHELL OIL PRODUCT	SIGNAL HILL	CA	CALIFORNIA
Jan-06	UNFINISHED OIL	INDONESIA	109	0	0	SHELL OIL PRODUCT	SIGNAL HILL	CA	CALIFORNIA
Jun-06	CRUDE OIL	CANADA	345	3.51	22.9	EXXONMOBIL	TORRANCE	CA	CALIFORNIA
Feb-06	CRUDE OIL	ECUADOR	377	1	18.8	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Mar-06	CRUDE OIL	ECUADOR	379	1	23.7	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Mar-06	CRUDE OIL	ECUADOR	720	1	18.8	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Apr-06	CRUDE OIL	ECUADOR	400	1	23.5	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Apr-06	CRUDE OIL	ECUADOR	156	2.21	18.8	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Apr-06	CRUDE OIL	ECUADOR	158	1	23.7	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Apr-06	CRUDE OIL	ECUADOR	378	1.5	23.6	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Apr-06	CRUDE OIL	ECUADOR	399	1	24	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
May-06	CRUDE OIL	ECUADOR	355	2.05	18.8	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
May-06	CRUDE OIL	ECUADOR	378	0.41	19.1	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Jul-06	CRUDE OIL	ECUADOR	362	2.14	19.2	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Sep-06	CRUDE OIL	ECUADOR	363	1.62	23.3	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Sep-06	CRUDE OIL	ECUADOR	360	2.19	20	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Sep-06	CRUDE OIL	ECUADOR	397	2.14	18.9	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Sep-06	CRUDE OIL	ECUADOR	288	0.1	19.7	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Oct-06	CRUDE OIL	ECUADOR	613	1.63	23.4	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Oct-06	CRUDE OIL	ECUADOR	360	2.14	19	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Oct-06	CRUDE OIL	ECUADOR	263	2.05	20	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA
Nov-06	CRUDE OIL	ECUADOR	379	2.11	19	UNKNOWN PROCESS	UNKNOWN PROCESSOR-C	CA	CALIFORNIA

RPT_PERI	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
Aug-07	UNFINISHED OILS, NAPHTH	CHINA, PEOPLES	88	0	0	CHEVRON USA INC	RICHMOND - SECTION 890	CA
Jan-07	CRUDE OIL	COLOMBIA	370	0.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
Apr-07	CRUDE OIL	COLOMBIA	360	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
May-07	CRUDE OIL	BOLIVIA	307	0.05	43.3	CONOCOPHILLIPS	SAN FRANCISCO	CA
Jun-07	CRUDE OIL	COLOMBIA	361	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
Jul-07	CRUDE OIL	VENEZUELA	362	0.24	41.3	CONOCOPHILLIPS	SAN FRANCISCO	CA
Aug-07	CRUDE OIL	COLOMBIA	738	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
Sep-07	CRUDE OIL	COLOMBIA	738	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
Oct-07	CRUDE OIL	AZERBAIJAN	134	0.16	35.1	CONOCOPHILLIPS	SAN FRANCISCO	CA
May-07	FUEL ETHANOL	COSTA RICA	41	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Mar-07	MOTOR GAS BLENDING CC	CANADA	66	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Apr-07	MOTOR GAS BLENDING CC	CANADA	63	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Apr-07	MOTOR GAS BLENDING CC	CHINA, PEOPLES	100	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Jul-07	MOTOR GAS BLENDING CC	TAIWAN	80	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Mar-07	MOTOR GAS BLENDING CC	CANADA	100	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
Jun-07	MOTOR GAS BLENDING CC	KOREA, SOUTH	80	0	0	SHELL OIL PRODUCTS US	SIGNAL HILL	CA
Nov-07	MOTOR GAS BLENDING CC	KOREA, SOUTH	104	0	0	SHELL OIL PRODUCTS US	SIGNAL HILL	CA
Jan-07	MOTOR GAS BLENDING CC	SWEDEN	100	0	0	SHELL OIL PRODUCTS US	SIGNAL HILL	CA
Jan-07	CRUDE OIL	NIGERIA	209	0.24	35.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jan-07	CRUDE OIL	SAUDI ARABIA	163	1.92	33.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jan-07	CRUDE OIL	INDONESIA	168	0.2	19.7	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jan-07	CRUDE OIL	IRAQ	100	2.6	30.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jan-07	CRUDE OIL	BRAZIL	130	0.77	20.6	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jan-07	CRUDE OIL	ECUADOR	254	2.05	20	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Feb-07	CRUDE OIL	COLOMBIA	358	0.5	28.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Feb-07	CRUDE OIL	IRAQ	270	2.6	30.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Feb-07	CRUDE OIL	IRAQ	301	2.6	30.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Feb-07	CRUDE OIL	ARGENTINA	102	0.2	24.7	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	ARGENTINA	275	0.2	23.9	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	NIGERIA	5	0.24	35.1	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	IRAQ	958	2.6	30.3	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	ANGOLA	735	0.39	28.9	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	ANGOLA	398	0.39	28.9	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	ANGOLA	468	0.39	29.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Mar-07	CRUDE OIL	BRAZIL	522	0.77	19.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	BRAZIL	488	0.77	19.8	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ANGOLA	99	0.52	23.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ANGOLA	584	0.39	29.8	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ARGENTINA	238	0.2	24.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	MEXICO	50	3.07	22.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	50	1.5	23.9	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	BRAZIL	343	0.9	19.89	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	370	2.08	18.7	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	542	1	29.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	378	1	29.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	6	2.1	24	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ECUADOR	260	2.1	18	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
May-07	CRUDE OIL	ANGOLA	325	0.71	29	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jun-07	CRUDE OIL	BRAZIL	358	0.8	19.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jun-07	CRUDE OIL	ECUADOR	342	0.34	18.6	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA

RPT_PERIC	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
30-Nov-08	UNFINISHED OILS, I	NETHERLANDS	136	0	0	CHEVRON USA INC	RICHMOND - SECTION 8	CA
31-Jan-08	CRUDE OIL	COLOMBIA	545	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
29-Feb-08	CRUDE OIL	COLOMBIA	345	0.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Apr-08	CRUDE OIL	ANGOLA	350	0.57	23.8	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Apr-08	CRUDE OIL	COLOMBIA	350	0.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Apr-08	CRUDE OIL	VENEZUELA	350	0.24	41.3	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-May-08	CRUDE OIL	CHINA, PEOPLES REP	40	0.29	21.84	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-May-08	CRUDE OIL	COLOMBIA	160	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-May-08	CRUDE OIL	COLOMBIA	200	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-Aug-08	CRUDE OIL	BOLIVIA	322	0.12	32.6	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-Aug-08	CRUDE OIL	COLOMBIA	305	0.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Sep-08	CRUDE OIL	BOLIVIA	320	0.12	34.3	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Sep-08	CRUDE OIL	COLOMBIA	335	1.77	28.7	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-Oct-08	CRUDE OIL	BRAZIL	76	1.1	38.2	CONOCOPHILLIPS	SAN FRANCISCO	CA
31-Jul-08	MOTOR GAS BLEND	TAIWAN	80	0	0	CONOCOPHILLIPS	SAN FRANCISCO	CA
30-Sep-08	FUEL ETHANOL	EL SALVADOR	50	0	0	NUSTAR ENERGY LP	SELBY/CROCKETT	CA
31-May-08	FUEL ETHANOL	EL SALVADOR	50	0	0	NUSTAR ENERGY LP	STOCKTON	CA
29-Feb-08	CRUDE OIL	CANADA	393	4.42	22.6	EXXONMOBIL REFINING &	TORRANCE	CA
30-Apr-08	CRUDE OIL	CANADA	50	4.42	23.5	EXXONMOBIL REFINING &	TORRANCE	CA
31-May-08	CRUDE OIL	CHINA, PEOPLES REP	287	0.13	21.2	EXXONMOBIL REFINING &	TORRANCE	CA
31-Aug-08	CRUDE OIL	CHAD	355	0.1	21.1	EXXONMOBIL REFINING &	TORRANCE	CA
31-Mar-08	CRUDE OIL	CANADA	399	4.42	22.8	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Jun-08	CRUDE OIL	COLOMBIA	360	0.77	28.7	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Jun-08	CRUDE OIL	AUSTRALIA	600	0.29	21.84	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Aug-08	CRUDE OIL	IRAQ	519	2.6	29.9	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Aug-08	CRUDE OIL	IRAQ	534	2.6	29	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Sep-08	CRUDE OIL	ECUADOR	133	2.1	19.5	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Sep-08	CRUDE OIL	ECUADOR	303	2.1	18.1	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Oct-08	CRUDE OIL	IRAQ	657	2	29.7	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Oct-08	CRUDE OIL	IRAQ	244	2	29.4	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Oct-08	CRUDE OIL	IRAQ	495	2	29.8	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Dec-08	CRUDE OIL	IRAQ	181	2	29.6	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Dec-08	CRUDE OIL	IRAQ	555	2	29.3	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Jun-08	FUEL ETHANOL	COSTA RICA	70	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Jun-08	FUEL ETHANOL	COSTA RICA	58	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Jul-08	FUEL ETHANOL	EL SALVADOR	75	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Sep-08	FUEL ETHANOL	BRAZIL	114	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Oct-08	FUEL ETHANOL	COSTA RICA	88	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Dec-08	FUEL ETHANOL	EL SALVADOR	79	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Dec-08	FUEL ETHANOL	EL SALVADOR	21	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Jan-08	MOTOR GAS BLEND	JAPAN	44	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Mar-08	MOTOR GAS BLEND	JAPAN	80	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-Mar-08	MOTOR GAS BLEND	TAIWAN	80	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Apr-08	MOTOR GAS BLEND	KOREA, SOUTH	121	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Apr-08	MOTOR GAS BLEND	BELGIUM	119	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
30-Apr-08	MOTOR GAS BLEND	ISRAEL	203	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA
31-May-08	MOTOR GAS BLEND	KOREA, SOUTH	50	0	0	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSOR	CA

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_ST
6/30/09 0:00	Unfinished Oils,	CAMEROON	287	0	0	CHEVRON USA INC	RICHMOND CA	CA
6/30/09 0:00	All Other Motor (	TAIWAN	80	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
8/31/09 0:00	All Other Motor (	TAIWAN	80	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/09 0:00	Crude Oil	COLOMBIA	360	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/09 0:00	Crude Oil	BOLIVIA	300	0.12	32.6	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/09 0:00	Crude Oil	COLOMBIA	340	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
1/31/09 0:00	All Other Motor (	CANADA	96	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	All Other Motor (	CANADA	100	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	All Other Motor (	KOREA, SOUTH	120	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	All Other Motor (	CANADA	75	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	All Other Motor (	CANADA	25	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	All Other Motor (	CANADA	34	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
3/31/09 0:00	All Other Motor (	KOREA, SOUTH	304	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
3/31/09 0:00	All Other Motor (	CANADA	75	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
3/31/09 0:00	All Other Motor (	CANADA	95	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
4/30/09 0:00	All Other Motor (	JAPAN	65	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
5/31/09 0:00	All Other Motor (	TAIWAN	46	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
5/31/09 0:00	All Other Motor (	TAIWAN	80	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
6/30/09 0:00	All Other Motor (	KOREA, SOUTH	312	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
6/30/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
6/30/09 0:00	All Other Motor (	CANADA	25	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
6/30/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
8/31/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
9/30/09 0:00	All Other Motor (	KOREA, SOUTH	105	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
10/31/09 0:00	All Other Motor (	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
11/30/09 0:00	All Other Motor (	KOREA, SOUTH	315	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
11/30/09 0:00	All Other Motor (	MALAYSIA	289	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
12/31/09 0:00	All Other Motor (	CANADA	15	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
12/31/09 0:00	All Other Motor (	CANADA	100	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ANGOLA	410	0.39	28.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ANGOLA	286	0.39	28.1	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	IRAQ	246	2	29.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ARGENTINA	206	0.2	24.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ANGOLA	299	0.39	28.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	IRAQ	97	2	29.4	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	BRAZIL	403	0.39	28.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ANGOLA	344	2	28.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	IRAQ	573	2	29.8	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	ANGOLA	174	0.39	28.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
1/31/09 0:00	Crude Oil	IRAQ	779	2	29.7	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	BRAZIL	245	1.14	20.6	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	OMAN	284	0.08	31.6	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	BRAZIL	410	1.14	20.6	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	OMAN	340	0.08	32	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	OMAN	373	0.08	32	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	IRAQ	476	2	30.1	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
2/28/09 0:00	Crude Oil	IRAQ	514	2	29.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA
3/31/09 0:00	Crude Oil	OMAN	327	0.08	33.3	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-C	CA

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STA
9/30/10 0:00	MGBC, Conventional E	KOREA, SOUTH	77	0	0	CHEVRON USA INC	RICHMOND CA	CA
2/28/10 0:00	Crude Oil	COLOMBIA	360	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
3/31/10 0:00	Crude Oil	COLOMBIA	360	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
5/31/10 0:00	Crude Oil	COLOMBIA	358	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
6/30/10 0:00	Crude Oil	RUSSIA	360	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
7/31/10 0:00	Crude Oil	RUSSIA	375	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/10 0:00	Crude Oil	ARGENTINA	379	0.05	38.08	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/10 0:00	Unfinished Oils, Heavy	RUSSIA	199	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
7/31/10 0:00	MGBC, Conventional E	SPAIN	143	0	0	NUSTAR ENERGY LP	SELBYCROCKETT	CA
1/31/10 0:00	All Other Motor Gas Bl	CANADA	100	0	0	BP WEST COAST PRODUCTS	TERMINAL 3	CA
8/31/10 0:00	Crude Oil	CANADA	359	3.51	20.5	EXXONMOBIL REFINING & SPI	TORRANCE	CA
9/30/10 0:00	Crude Oil	ECUADOR	359	2.01	18.3	EXXONMOBIL REFINING & SPI	TORRANCE	CA
10/31/10 0:00	Crude Oil	CANADA	339	3.51	21.4	EXXONMOBIL REFINING & SPI	TORRANCE	CA
10/31/10 0:00	Crude Oil	CANADA	510	3.51	23.4	EXXONMOBIL REFINING & SPI	TORRANCE	CA
3/31/10 0:00	All Other Motor Gas Bl	KOREA, SOUTH	312	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
7/31/10 0:00	All Other Motor Gas Bl	KOREA, SOUTH	312	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
8/31/10 0:00	All Other Motor Gas Bl	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
9/30/10 0:00	All Other Motor Gas Bl	RUSSIA	64	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
9/30/10 0:00	All Other Motor Gas Bl	CANADA	50	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
5/31/10 0:00	Crude Oil	ECUADOR	317	1	23.5	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
11/30/10 0:00	Crude Oil	CANADA	348	3.61	21.2	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
1/31/10 0:00	Unfinished Oils, Heavy	ALGERIA	380	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
10/31/10 0:00	Unfinished Oils, Heavy	CANADA	55	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
10/31/10 0:00	Unfinished Oils, Heavy	NETHERLANDS	66	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
11/30/10 0:00	Unfinished Oils, Heavy	CANADA	4	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
11/30/10 0:00	Unfinished Oils, Heavy	MEXICO	71	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
12/31/10 0:00	Unfinished Oils, Heavy	VIRGIN ISLANDS, U.S.	350	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
12/31/10 0:00	Unfinished Oils, Heavy	ALGERIA	378	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
12/31/10 0:00	Unfinished Oils, Heavy	ALGERIA	351	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
11/30/10 0:00	Unfinished Oils, Naphtl	INDONESIA	249	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
12/31/10 0:00	Unfinished Oils, Naphtl	PERU	322	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-	CA
1/31/10 0:00	Crude Oil	CANADA	528	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
1/31/10 0:00	Crude Oil	COLOMBIA	247	1.72	20.8	TESORO CORP	WILIMINGTON LOS ANGE	CA
2/28/10 0:00	Crude Oil	CANADA	695	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
2/28/10 0:00	Crude Oil	ECUADOR	377	1.5	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
2/28/10 0:00	Crude Oil	PERU	360	0.3	34	TESORO CORP	WILIMINGTON LOS ANGE	CA
3/31/10 0:00	Crude Oil	ECUADOR	490	1.5	23.9	TESORO CORP	WILIMINGTON LOS ANGE	CA
3/31/10 0:00	Crude Oil	ECUADOR	671	1.5	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
4/30/10 0:00	Crude Oil	CANADA	389	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
4/30/10 0:00	Crude Oil	ECUADOR	471	1	29.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
4/30/10 0:00	Crude Oil	ECUADOR	738	2	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
4/30/10 0:00	Crude Oil	PERU	380	0.3	34	TESORO CORP	WILIMINGTON LOS ANGE	CA
5/31/10 0:00	Crude Oil	CANADA	765	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
7/31/10 0:00	Crude Oil	CANADA	776	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
7/31/10 0:00	Crude Oil	ECUADOR	379	2	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
8/31/10 0:00	Crude Oil	CANADA	544	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
8/31/10 0:00	Crude Oil	ECUADOR	604	1.5	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
9/30/10 0:00	Crude Oil	CANADA	345	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
9/30/10 0:00	Crude Oil	ECUADOR	954	1.5	19	TESORO CORP	WILIMINGTON LOS ANGE	CA
10/31/10 0:00	Crude Oil	CANADA	706	4.1	13.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
10/31/10 0:00	Crude Oil	COLOMBIA	713	1.72	20.8	TESORO CORP	WILIMINGTON LOS ANGE	CA

RPT_PERIOD	R_S_NAME	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
5/31/11 0:00	VITOL INC	Unfinished Oils, Naj	THAILAND	98	0	0	CHEVRON USA INC	RICHMOND CA	CA
4/30/11 0:00	PHILLIPS 66 CO	Crude Oil	RUSSIA	497	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
5/31/11 0:00	PHILLIPS 66 CO	Crude Oil	RUSSIA	245	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
7/31/11 0:00	PHILLIPS 66 CO	Crude Oil	RUSSIA	320	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
8/31/11 0:00	PHILLIPS 66 CO	Crude Oil	RUSSIA	427	0.61	40.1	PHILLIPS 66 CO	SAN FRANCISCO	CA
9/30/11 0:00	PHILLIPS 66 CO	Crude Oil	SAUDI ARABIA	495	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/11 0:00	PHILLIPS 66 CO	Crude Oil	CANADA	290	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/11 0:00	PHILLIPS 66 CO	Crude Oil	CANADA	153	2.5	12.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
11/30/11 0:00	PHILLIPS 66 CO	Crude Oil	AUSTRALIA	302	0.21	19.4	PHILLIPS 66 CO	SAN FRANCISCO	CA
2/28/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	ARUBA	75	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
3/31/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	RUSSIA	150	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
4/30/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	ARUBA	130	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
8/31/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	ARUBA	227	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
9/30/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	ARUBA	222	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	RUSSIA	151	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
11/30/11 0:00	PHILLIPS 66 CO	Unfinished Oils, Hea	VIRGIN ISLANDS, U.S.	211	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/11 0:00	WILLIAMS OLEFINS LLC	All Other Motor Gas	CANADA	9	0	0	EXXONMOBIL REFINING	TORRANCE	CA
1/31/11 0:00	CHEVRON MARINE PROI	Unfinished Oils, Hea	ALGERIA	377	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
2/28/11 0:00	CHEVRON MARINE PROI	Unfinished Oils, Hea	ALGERIA	384	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
4/30/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	ARUBA	155	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
10/31/11 0:00	BP WEST COAST PRODU	Crude Oil	BRAZIL	83	0.55	18.2	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
1/31/11 0:00	NESTE OIL USA LLC	All Other Motor Gas	CANADA	52	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
3/31/11 0:00	NESTE OIL USA LLC	All Other Motor Gas	CANADA	50	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
3/31/11 0:00	NESTE OIL USA LLC	All Other Motor Gas	CANADA	100	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
12/31/11 0:00	CHEVRON USA INC	All Other Motor Gas	CANADA	46	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
3/31/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	16	4.1	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
3/31/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	3	4.1	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
4/30/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	16	4.1	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
4/30/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	3	4.1	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
5/31/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	9	4.81	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
5/31/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	3	4.81	17	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
6/30/11 0:00	ASTRA OIL CO LLC	Crude Oil	CANADA	279	3.6	23.1	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
8/31/11 0:00	CONNACHER OIL & GAS	Crude Oil	CANADA	10	4.41	17.1	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
10/31/11 0:00	ASTRA OIL CO LLC	Crude Oil	CANADA	179	3.71	21.32	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
5/31/11 0:00	ASTRA OIL CO LLC	Crude Oil	ECUADOR	283	1.53	23.9	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
4/30/11 0:00	VITOL INC	All Other Motor Gas	INDIA	82	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
4/30/11 0:00	VITOL INC	All Other Motor Gas	KOREA, SOUTH	51	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
1/31/11 0:00	IPC USA INC	MGBC, Convention	KOREA, SOUTH	159	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
1/31/11 0:00	IPC USA INC	MGBC, Convention	KOREA, SOUTH	141	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
10/31/11 0:00	BP WEST COAST PRODU	Crude Oil	OMAN	103	1.45	31.9	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
5/31/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	SINGAPORE	120	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
9/30/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	TRINIDAD & TOBAGO	171	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
11/30/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	TRINIDAD & TOBAGO	220	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
12/31/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	TRINIDAD & TOBAGO	221	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
5/31/11 0:00	EXXONMOBIL OIL CORP	Unfinished Oils, Hea	VENEZUELA	220	0	0	UNKNOWN PROCESSOF	UNKNOWN PROCESS	CA
1/31/11 0:00	TESORO CORP	Crude Oil	ECUADOR	724	1.5	19	TESORO CORP	WILIMINGTON LOS AI	CA
2/28/11 0:00	TESORO CORP	Crude Oil	CANADA	633	4.1	13.2	TESORO CORP	WILIMINGTON LOS AI	CA
2/28/11 0:00	TESORO CORP	Crude Oil	ECUADOR	691	1.5	19	TESORO CORP	WILIMINGTON LOS AI	CA
3/31/11 0:00	TESORO CORP	Crude Oil	CANADA	368	4.1	13.2	TESORO CORP	WILIMINGTON LOS AI	CA
4/30/11 0:00	TESORO CORP	Crude Oil	ECUADOR	1115	1.5	19	TESORO CORP	WILIMINGTON LOS AI	CA
5/31/11 0:00	TESORO CORP	Crude Oil	ECUADOR	90	1.5	21.1	TESORO CORP	WILIMINGTON LOS AI	CA

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
10/31/12 0:00	MGBC, Conventional B	CANADA	25	0	0	CHEVRON USA INC	RICHMOND CA	CA
2/29/12 0:00	Crude Oil	PERU	147	3.34	27.5	PHILLIPS 66 CO	SAN FRANCISCO	CA
3/31/12 0:00	Crude Oil	PERU	136	3.34	27.5	PHILLIPS 66 CO	SAN FRANCISCO	CA
5/31/12 0:00	Crude Oil	COLOMBIA	359	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
6/30/12 0:00	Crude Oil	RUSSIA	746	0.61	22.93	PHILLIPS 66 CO	SAN FRANCISCO	CA
7/31/12 0:00	Crude Oil	SAUDI ARABIA	818	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
8/31/12 0:00	Crude Oil	ALGERIA	598	0.3	44.3	PHILLIPS 66 CO	SAN FRANCISCO	CA
8/31/12 0:00	Crude Oil	SAUDI ARABIA	367	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
9/30/12 0:00	Crude Oil	SAUDI ARABIA	560	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/12 0:00	Crude Oil	SAUDI ARABIA	326	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
10/31/12 0:00	Crude Oil	COLOMBIA	350	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
11/30/12 0:00	Crude Oil	SAUDI ARABIA	643	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/12 0:00	Crude Oil	SAUDI ARABIA	362	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
12/31/12 0:00	Unfinished Oils, Heavy	RUSSIA	150	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
1/31/12 0:00	All Other Motor Gas Ble	CANADA	53	0	0	BP WEST COAST PROI	TERMINAL 2	CA
2/29/12 0:00	All Other Motor Gas Ble	CANADA	52	0	0	BP WEST COAST PROI	TERMINAL 2	CA
3/31/12 0:00	All Other Motor Gas Ble	CANADA	60	0	0	BP WEST COAST PROI	TERMINAL 2	CA
5/31/12 0:00	All Other Motor Gas Ble	CANADA	40	0	0	BP WEST COAST PROI	TERMINAL 2	CA
6/30/12 0:00	All Other Motor Gas Ble	CANADA	75	0	0	BP WEST COAST PROI	TERMINAL 2	CA
7/31/12 0:00	All Other Motor Gas Ble	CANADA	50	0	0	BP WEST COAST PROI	TERMINAL 2	CA
8/31/12 0:00	All Other Motor Gas Ble	CANADA	80	0	0	BP WEST COAST PROI	TERMINAL 2	CA
11/30/12 0:00	All Other Motor Gas Ble	CANADA	100	0	0	BP WEST COAST PROI	TERMINAL 2	CA
12/31/12 0:00	All Other Motor Gas Ble	CANADA	100	0	0	BP WEST COAST PROI	TERMINAL 2	CA
1/31/12 0:00	All Other Motor Gas Ble	CANADA	23	0	0	EXXONMOBIL REFININ	TORRANCE	CA
5/31/12 0:00	All Other Motor Gas Ble	CANADA	22	0	0	EXXONMOBIL REFININ	TORRANCE	CA
11/30/12 0:00	Crude Oil	AUSTRALIA	573	0.19	19.3	EXXONMOBIL REFININ	TORRANCE	CA
10/31/12 0:00	All Other Motor Gas Ble	MALAYSIA	101	0	0	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
1/31/12 0:00	Crude Oil	ECUADOR	295	1.99	19.2	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
2/29/12 0:00	Crude Oil	CANADA	4	5.51	17.1	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
4/30/12 0:00	Crude Oil	CANADA	3	3.9	16	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
4/30/12 0:00	Crude Oil	CANADA	7	3.9	16	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
5/31/12 0:00	Crude Oil	CANADA	3	4.13	16.55	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
5/31/12 0:00	Crude Oil	CANADA	3	4.13	16.55	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
7/31/12 0:00	Crude Oil	CANADA	4	4.13	16.55	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
10/31/12 0:00	Unfinished Oils, Heavy	RUSSIA	126	0	0	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
10/31/12 0:00	Unfinished Oils, Heavy	INDIA	46	0	0	UNKNOWN PROCESSC	UNKNOWN PROCESSC	CA
1/31/12 0:00	Crude Oil	ECUADOR	397	1.55	23.7	TESORO CORP	WILIMINGTON LOS ANC	CA
1/31/12 0:00	Crude Oil	ECUADOR	330	1.5	21.1	TESORO CORP	WILIMINGTON LOS ANC	CA
1/31/12 0:00	Crude Oil	ECUADOR	381	1.5	23.9	TESORO CORP	WILIMINGTON LOS ANC	CA
2/29/12 0:00	Crude Oil	ECUADOR	1453	1.5	21.1	TESORO CORP	WILIMINGTON LOS ANC	CA
2/29/12 0:00	Crude Oil	ECUADOR	106	1.5	23.9	TESORO CORP	WILIMINGTON LOS ANC	CA
2/29/12 0:00	Crude Oil	SAUDI ARABIA	700	0.06	34	TESORO CORP	WILIMINGTON LOS ANC	CA
3/31/12 0:00	Crude Oil	BRAZIL	167	0.55	17.7	TESORO CORP	WILIMINGTON LOS ANC	CA
3/31/12 0:00	Crude Oil	BRAZIL	170	0.75	20.6	TESORO CORP	WILIMINGTON LOS ANC	CA
3/31/12 0:00	Crude Oil	CANADA	301	4	13.2	TESORO CORP	WILIMINGTON LOS ANC	CA
3/31/12 0:00	Crude Oil	COLOMBIA	269	1.72	20.8	TESORO CORP	WILIMINGTON LOS ANC	CA
3/31/12 0:00	Crude Oil	ECUADOR	853	1.5	23	TESORO CORP	WILIMINGTON LOS ANC	CA
4/30/12 0:00	Crude Oil	BRAZIL	204	0.76	19.9	TESORO CORP	WILIMINGTON LOS ANC	CA
4/30/12 0:00	Crude Oil	BRAZIL	158	0.75	19.8	TESORO CORP	WILIMINGTON LOS ANC	CA
4/30/12 0:00	Crude Oil	ECUADOR	894	2.04	19.5	TESORO CORP	WILIMINGTON LOS ANC	CA
5/31/12 0:00	Crude Oil	TRINIDAD & TOB	360	0.63	31.8	TESORO CORP	WILIMINGTON LOS ANC	CA

RPT_PERI	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
Dec-13	All Other Motor Gas B	CANADA	36	0	0	CHEVRON USA INC	RICHMOND CA	CA
May-13	All Other Motor Gas B	JAPAN	30	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jan-13	Crude Oil	SAUDI ARABIA	657	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
Feb-13	Crude Oil	CANADA	16	2.72	22.74	PHILLIPS 66 CO	SAN FRANCISCO	CA
Feb-13	Crude Oil	IRAQ	100	2.82	33	PHILLIPS 66 CO	SAN FRANCISCO	CA
Mar-13	Crude Oil	SAUDI ARABIA	500	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
Mar-13	Crude Oil	CANADA	10	2.72	22.74	PHILLIPS 66 CO	SAN FRANCISCO	CA
Mar-13	Crude Oil	COLOMBIA	260	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
Apr-13	Crude Oil	CANADA	11	2.72	22.74	PHILLIPS 66 CO	SAN FRANCISCO	CA
Apr-13	Crude Oil	SAUDI ARABIA	484	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
Apr-13	Crude Oil	AUSTRALIA	210	0.13	21.9	PHILLIPS 66 CO	SAN FRANCISCO	CA
May-13	Crude Oil	SAUDI ARABIA	500	4	30.6	PHILLIPS 66 CO	SAN FRANCISCO	CA
May-13	Crude Oil	CANADA	20	1	22.74	PHILLIPS 66 CO	SAN FRANCISCO	CA
May-13	Crude Oil	AUSTRALIA	313	0.13	21.9	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jun-13	Crude Oil	CANADA	16	2.72	22.74	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jun-13	Crude Oil	SAUDI ARABIA	493	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jul-13	Crude Oil	SAUDI ARABIA	495	1.1	38.2	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jul-13	Crude Oil	COLOMBIA	362	0.77	22.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
Aug-13	Crude Oil	CANADA	44	2.72	20.94	PHILLIPS 66 CO	SAN FRANCISCO	CA
Aug-13	Crude Oil	SAUDI ARABIA	495	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Aug-13	Crude Oil	ECUADOR	276	1.4	23.9	PHILLIPS 66 CO	SAN FRANCISCO	CA
Sep-13	Crude Oil	SAUDI ARABIA	494	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Oct-13	Crude Oil	SAUDI ARABIA	493	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Nov-13	Crude Oil	SAUDI ARABIA	526	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Nov-13	Crude Oil	SAUDI ARABIA	390	0.23	31.4	PHILLIPS 66 CO	SAN FRANCISCO	CA
Dec-13	Crude Oil	SAUDI ARABIA	272	2.4	31.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jan-13	Unfinished Oils, Heav	SPAIN	27	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jan-13	Unfinished Oils, Heav	RUSSIA	48	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Mar-13	Unfinished Oils, Heav	INDIA	358	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jun-13	Unfinished Oils, Heav	INDIA	231	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Jul-13	Unfinished Oils, Heav	INDIA	124	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Aug-13	Unfinished Oils, Heav	RUSSIA	191	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Nov-13	Unfinished Oils, Heav	INDIA	238	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Oct-13	Unfinished Oils, Heav	COLOMBIA	239	0	0	UNKNOWN PROCESSO	UNKNOWN PROCESSOF	CA
Jun-13	Unfinished Oils, Heav	MALTA	156	0	0	UNKNOWN PROCESSO	UNKNOWN PROCESSOF	CA
Mar-13	Crude Oil	CHAD	360	0.1	21.5	EXXONMOBIL REFININ	TORRANCE	CA
Apr-13	Crude Oil	ECUADOR	447	1.55	24.2	EXXONMOBIL REFININ	TORRANCE	CA
Sep-13	Crude Oil	CHAD	360	0.1	21.4	EXXONMOBIL REFININ	TORRANCE	CA
Sep-13	Crude Oil	ECUADOR	393	1.55	24.4	EXXONMOBIL REFININ	TORRANCE	CA
Jan-13	All Other Motor Gas B	CANADA	100	0	0	BP WEST COAST PROD	TERMINAL 2	CA
Nov-13	All Other Motor Gas B	CANADA	75	0	0	TESORO LOGISTICS OI	TERMINAL 2	CA
Feb-13	All Other Motor Gas B	CANADA	8	0	0	UNKNOWN PROCESSO	UNKNOWN PROCESSOF	CA
Jan-13	Crude Oil	ECUADOR	352	1.52	23.6	TESORO CORP	WILIMINGTON LOS ANGI	CA
Jan-13	Crude Oil	ECUADOR	394	2.07	19.5	TESORO CORP	WILIMINGTON LOS ANGI	CA
Jan-13	Crude Oil	ECUADOR	333	2.04	19.5	TESORO CORP	WILIMINGTON LOS ANGI	CA
Jan-13	Crude Oil	ECUADOR	372	2.01	19.6	TESORO CORP	WILIMINGTON LOS ANGI	CA
Jan-13	Crude Oil	COLOMBIA	218	1.03	23.9	TESORO CORP	WILIMINGTON LOS ANGI	CA

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
1/31/14 0:00	Unfinished Oils, Hea	ALGERIA	78	0	0	CHEVRON USA INC	RICHMOND	CA
1/31/14 0:00	All Other Motor Gas	CANADA	45	0	0	CHEVRON USA INC	RICHMOND CA	CA
1/31/14 0:00	Crude Oil	SAUDI ARABIA	516	0.23	31.4	PHILLIPS 66 CO	SAN FRANCISCO	CA
1/31/14 0:00	Unfinished Oils, Hea	INDIA	178	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
1/31/14 0:00	Crude Oil	IRAQ	294	2.91	30.4	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	IRAQ	691	2.93	30.7	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	IRAQ	300	2.9	30.8	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	IRAQ	446	2.95	30.6	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	IRAQ	298	2.98	30.5	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	200	1.52	19.6	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	410	1.54	19.5	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	138	1.57	19.4	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	208	1.43	19.6	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	EQUATORIAL GUINEA	327	0.39	31.9	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	ECUADOR	326	1.95	19.6	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	ECUADOR	351	1.33	25	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	ANGOLA	340	0.45	25.2	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	ANGOLA	331	0.45	25.8	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	BRAZIL	410	0.43	29.7	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	245	0.83	26	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	Crude Oil	COLOMBIA	255	0.83	26.6	TESORO CORP	WILIMINGTON LOS AI	CA
1/31/14 0:00	All Other Motor Gas	CANADA	100	0	0	TESORO REFINING & MARI	WILMINGTON	CA
1/31/14 0:00	Crude Oil	IRAQ	47	2.18	30.9	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	IRAQ	253	2.18	30.9	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	IRAQ	352	2.18	28.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	IRAQ	200	2.18	28.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	IRAQ	299	2.18	28.3	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	233	1.75	24.9	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	53	1.75	24.9	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	399	3.42	19.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	63	3.42	19.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	453	3.42	19.3	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	COLOMBIA	55	0.72	28.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	2	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	34	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	9	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	4	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	28	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	6	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	18	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	2	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	4	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	1	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	7	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	17	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	14	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	20	2.46	11	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
1/31/14 0:00	Crude Oil	CANADA	50	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
1/31/14 0:00	Crude Oil	CANADA	214	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
1/31/14 0:00	Crude Oil	CANADA	260	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
1/31/14 0:00	Crude Oil	CANADA	26	3.77	22.4	UNKNOWN PROCESSOR-C	UNKNOWN PROCESS	CO

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
2/28/14 0:00	Unfinished Oils, Hea	ALGERIA	370	0	0	CHEVRON USA INC	RICHMOND	CA
2/28/14 0:00	All Other Motor Gas I	CANADA	38	0	0	CHEVRON USA INC	RICHMOND CA	CA
2/28/14 0:00	Crude Oil	SAUDI ARABIA	834	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
2/28/14 0:00	Crude Oil	IRAQ	642	2.93	30.5	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	445	2.81	30.5	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	467	2.84	30.4	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	578	3.07	29	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	378	3.14	29.4	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	150	3.28	28.4	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	2	2.84	30.4	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	IRAQ	148	2.84	30.4	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	ANGOLA	81	0.4	25.7	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	ANGOLA	420	0.4	26.1	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	ANGOLA	289	0.41	25.8	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	BRAZIL	348	0.45	29.3	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	Crude Oil	BRAZIL	286	0.45	29.2	TESORO CORP	WILIMINGTON LOS ANG	CA
2/28/14 0:00	All Other Motor Gas I	CANADA	75	0	0	TESORO REFINING & MAR	WILMINGTON	CA
2/28/14 0:00	Crude Oil	IRAQ	398	2.18	29.8	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	VENEZUELA	317	2	19.8	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	VENEZUELA	31	2	19.8	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	279	3.54	23	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	27	3.54	23	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	IRAQ	152	2.18	30.4	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	20	2.18	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	1	2.18	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	3	2.18	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	8	2.46	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	10	2.64	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	7	2.64	21.5	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Unfinished Oils, Hea	RUSSIA	319	0	0	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Unfinished Oils, Hea	GERMANY	24	0	0	VALERO REFINING CO CAI	WILMINGTON REFINER	CA
2/28/14 0:00	Crude Oil	CANADA	100	3.71	21	SUNCOR ENERGY USA IN(	COMMERCE CITY WES	CO
2/28/14 0:00	Crude Oil	CANADA	237	4.1	13.2	SUNCOR ENERGY USA IN(	COMMERCE CITY WES	CO
2/28/14 0:00	Crude Oil	CANADA	291	3.08	19.53	SUNCOR ENERGY USA IN(	COMMERCE CITY WES	CO
2/28/14 0:00	Crude Oil	CANADA	25	3.15	21.9	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSO	CO
2/28/14 0:00	Crude Oil	CANADA	24	3.52	22.67	UNKNOWN PROCESSOR-(	UNKNOWN PROCESSO	CO
2/28/14 0:00	MGBC, Reformulatec	BELGIUM	140	0	0	GULF OIL LP	NEW HAVEN	CT
2/28/14 0:00	MGBC, Reformulatec	CANADA	265	0	0	MAGELLAN TERMINALS H(	NEW HAVEN 3	CT
2/28/14 0:00	Crude Oil	CANADA	19	4.13	16.55	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	4	4.13	16.55	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	3	3.54	19.6	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	2	3.36	19.7	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	NIGERIA	107	0.18	51.5	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	SAUDI ARABIA	199	2.01	33.1	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	120	3.07	12.5	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	65	0.9	36.3	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	22	3.36	39.7	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	67	2.39	34.2	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	66	2.39	32.6	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Crude Oil	CANADA	58	0.84	35.2	DELAWARE CITY REFININ(	DELAWARE CITY	DE
2/28/14 0:00	Unfinished Oils, Resi	RUSSIA	315	0	0	DELAWARE CITY REFININ(	DELAWARE CITY	DE

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
3/31/14 0:00	All Other Motor Ga	CANADA	30	0	0	CHEVRON USA INC	RICHMOND CA	CA
3/31/14 0:00	All Other Motor Ga	CANADA	39	0	0	CHEVRON USA INC	RICHMOND CA	CA
3/31/14 0:00	Crude Oil	SAUDI ARABIA	278	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
3/31/14 0:00	All Other Motor Ga	CANADA	75	0	0	TESORO LOGISTICS OPNS LLC	TERMINAL 2	CA
3/31/14 0:00	Crude Oil	CANADA	245	3.46	24.1	TESORO CORP	WILIMINGTON LOS ANGELE	CA
3/31/14 0:00	Crude Oil	ECUADOR	396	1.95	19.9	TESORO CORP	WILIMINGTON LOS ANGELE	CA
3/31/14 0:00	Crude Oil	IRAQ	270	2.64	29.7	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	IRAQ	361	2.91	29.7	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	IRAQ	246	2.18	29.3	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	IRAQ	348	2.18	29.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	COLOMBIA	301	1.75	19.9	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	170	3.54	23.6	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	IRAQ	154	2.18	29.6	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	12	2.46	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	12	2.46	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	2	5.5	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	7	5.5	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	10	3.42	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	1	3.42	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	1	2.18	21.5	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Unfinished Oils, H	COLOMBIA	299	0	0	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Unfinished Oils, H	SPAIN	160	0	0	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Unfinished Oils, H	RUSSIA	204	0	0	VALERO REFINING CO CALIFORN	WILMINGTON REFINERY	CA
3/31/14 0:00	Crude Oil	CANADA	298	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
3/31/14 0:00	Crude Oil	CANADA	237	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
3/31/14 0:00	Crude Oil	CANADA	25	3.58	22.3	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-C	CO
3/31/14 0:00	Crude Oil	CANADA	26	3.52	22	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-C	CO
3/31/14 0:00	MGBC, Reformula	UNITED KINGDOM	176	0	0	GULF OIL LP	NEW HAVEN	CT
3/31/14 0:00	MGBC, Reformula	NETHERLANDS	149	0	0	GULF OIL LP	NEW HAVEN	CT
3/31/14 0:00	All Other Motor Ga	INDIA	1	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	UNITED KINGDOM	7	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	INDIA	3	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	UNITED KINGDOM	28	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	UNITED KINGDOM	7	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	NETHERLANDS	95	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	GERMANY	107	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	All Other Motor Ga	FRANCE	114	0	0	MAGELLAN TERMINALS HOLDING	NEW HAVEN 85 EAST	CT
3/31/14 0:00	Crude Oil	CANADA	4	4.13	16.55	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	16	4.13	16.55	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	133	3.04	17	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	67	3.04	17	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	566	3.04	17	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	16	3.04	17	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	NIGERIA	80	0.77	63.2	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	NIGERIA	81	0.77	63.2	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	COLOMBIA	219	1.14	22.9	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	COLOMBIA	331	0.98	27	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	IRAQ	344	3.08	28.6	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	VENEZUELA	212	1.55	19.5	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	VENEZUELA	336	1.55	19.5	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE
3/31/14 0:00	Crude Oil	CANADA	132	3.19	12.7	DELAWARE CITY REFINING CO LL	DELAWARE CITY	DE

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
4/30/14 0:00	Unfinished Oils, I	ALGERIA	256	0	0	CHEVRON USA INC	RICHMOND	CA
4/30/14 0:00	All Other Motor G	CANADA	26	0	0	CHEVRON USA INC	RICHMOND CA	CA
4/30/14 0:00	Crude Oil	SAUDI ARABIA	884	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
4/30/14 0:00	Crude Oil	IRAQ	397	2.18	29.3	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	IRAQ	372	2.18	29.2	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	IRAQ	207	2.18	29	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	COLOMBIA	300	1.75	19.4	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	ECUADOR	483	1.27	24.5	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	COLOMBIA	100	0.61	28.2	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Unfinished Oils, I	BELGIUM	368	0	0	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Unfinished Oils, I	BELGIUM	224	0	0	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Unfinished Oils, I	RUSSIA	121	0	0	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Unfinished Oils, I	BELGIUM	19	0	0	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Unfinished Oils, I	RUSSIA	10	0	0	VALERO REFINING CO CALI	WILMINGTON REFINER	CA
4/30/14 0:00	Crude Oil	CANADA	309	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
4/30/14 0:00	Crude Oil	CANADA	178	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
4/30/14 0:00	Crude Oil	CANADA	50	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
4/30/14 0:00	Crude Oil	CANADA	25	3.58	21.5	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSO	CO
4/30/14 0:00	Crude Oil	CANADA	25	3.77	22.5	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSO	CO
4/30/14 0:00	MGBC, Reformul	NETHERLANDS	81	0	0	GULF OIL LP	NEW HAVEN	CT
4/30/14 0:00	MGBC, Reformul	NETHERLANDS	54	0	0	GULF OIL LP	NEW HAVEN	CT
4/30/14 0:00	MGBC, Reformul	NETHERLANDS	115	0	0	GULF OIL LP	NEW HAVEN	CT
4/30/14 0:00	All Other Motor G	UNITED KINGDOM	242	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	UNITED KINGDOM	9	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	NETHERLANDS	12	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	FRANCE	31	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	BELGIUM	123	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	INDIA	48	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	All Other Motor G	INDIA	79	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	MGBC, Reformul	CANADA	42	0	0	MAGELLAN TERMINALS HOI	NEW HAVEN 3	CT
4/30/14 0:00	MGBC, Reformul	NETHERLANDS	240	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING	CT
4/30/14 0:00	MGBC, Reformul	NETHERLANDS	20	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
4/30/14 0:00	Crude Oil	CANADA	1	4.13	16.55	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	455	3.04	17	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	23	3.04	17	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	407	3.04	17	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	1	3.04	17	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	COLOMBIA	234	1.14	22.7	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	IRAQ	217	3.13	33.3	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	IRAQ	217	3.09	33.3	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	COLOMBIA	251	0.98	24.8	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	156	3.19	12.6	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	69	1.09	36	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	66	1.09	37.6	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	66	1.09	36.2	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	63	1.09	37	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	72	1.09	37.2	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	73	1.09	37.2	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	68	1.46	33.2	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	70	1.46	32.3	DELAWARE CITY REFINING	DELAWARE CITY	DE
4/30/14 0:00	Crude Oil	CANADA	64	1.46	34.2	DELAWARE CITY REFINING	DELAWARE CITY	DE

RPT_PERIOD	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
5/31/14 0:00	Unfinished Oils, Heavy	ALGERIA	366	0	0	CHEVRON USA INC	RICHMOND	CA
5/31/14 0:00	All Other Motor Gas Ble	CANADA	37	0	0	CHEVRON USA INC	RICHMOND CA	CA
5/31/14 0:00	Crude Oil	COLOMBIA	337	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
5/31/14 0:00	Crude Oil	SAUDI ARABIA	491	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
5/31/14 0:00	All Other Motor Gas Ble	CANADA	149	0	0	TESORO LOGISTICS OPNS	TERMINAL 2	CA
5/31/14 0:00	Crude Oil	IRAQ	292	2.18	28.7	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	180	2.18	28.7	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	300	2.18	29.1	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	399	2.18	29.3	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	130	2.18	29.1	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	298	2.18	29.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	COLOMBIA	471	1.72	19	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	54	2.18	29	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	CANADA	108	2.46	21.5	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	IRAQ	197	2.18	28.7	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	CANADA	7	2.46	39.4	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Unfinished Oils, Heavy	TRINIDAD & TOBA	350	0	0	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Unfinished Oils, Heavy	UNITED KINGDOM	65	0	0	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Unfinished Oils, Heavy	UNITED KINGDOM	313	0	0	VALERO REFINING CO CAL	WILMINGTON REFINE	CA
5/31/14 0:00	Crude Oil	CANADA	57	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
5/31/14 0:00	Crude Oil	CANADA	63	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
5/31/14 0:00	Crude Oil	CANADA	52	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
5/31/14 0:00	Crude Oil	CANADA	307	3.77	22.2	UNKNOWN PROCESSOR-C	UNKNOWN PROCESS	CO
5/31/14 0:00	Crude Oil	CANADA	25	3.58	22	UNKNOWN PROCESSOR-C	UNKNOWN PROCESS	CO
5/31/14 0:00	Crude Oil	CANADA	26	3.77	21.2	UNKNOWN PROCESSOR-C	UNKNOWN PROCESS	CO
5/31/14 0:00	MGBC, Gasoline Treate	NORWAY	23	0	0	GULF OIL LP	NEW HAVEN	CT
5/31/14 0:00	MGBC, Gasoline Treate	NORWAY	76	0	0	GULF OIL LP	NEW HAVEN	CT
5/31/14 0:00	MGBC, Reformulated E	NETHERLANDS	90	0	0	GULF OIL LP	NEW HAVEN	CT
5/31/14 0:00	MGBC, Reformulated E	NETHERLANDS	26	0	0	GULF OIL LP	NEW HAVEN	CT
5/31/14 0:00	MGBC, Reformulated E	NETHERLANDS	188	0	0	GULF OIL LP	NEW HAVEN	CT
5/31/14 0:00	All Other Motor Gas Ble	SPAIN	1	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	NIGERIA	6	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	FRANCE	33	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	SPAIN	5	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	SPAIN	5	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	NIGERIA	27	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	All Other Motor Gas Ble	FRANCE	153	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	MGBC, Reformulated E	CANADA	256	0	0	MAGELLAN TERMINALS HO	NEW HAVEN 3	CT
5/31/14 0:00	MGBC, Reformulated E	NETHERLANDS	115	0	0	MOTIVA ENTERPRISES LL	NEW HAVEN BLENDIN	CT
5/31/14 0:00	MGBC, Reformulated E	NETHERLANDS	40	0	0	MAGELLAN PIPELINE CO L	NEW HAVEN FORBES	CT
5/31/14 0:00	All Other Motor Gas Ble	CANADA	50	0	0	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	VENEZUELA	599	1.55	20.1	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	ANGOLA	515	0.04	33.1	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	196	3.19	22.3	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	27	3.19	12.3	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	14	1.09	37.6	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	62	1.09	35.4	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	55	1.09	37	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	68	1.09	37.6	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	67	1.09	36.4	DELAWARE CITY REFININ	DELAWARE CITY	DE
5/31/14 0:00	Crude Oil	CANADA	75	1.09	36.9	DELAWARE CITY REFININ	DELAWARE CITY	DE

RPT_PERIC	PROD_NAME	PORT_CITY	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM
Jun-14	All Other Motor Gas B	RICHMOND, CA	KOREA, SOUTH	41	0	0	CHEVRON USA INC
Jun-14	All Other Motor Gas B	INTER. FALLS,MN	CANADA	29	0	0	CHEVRON USA INC
Jun-14	Crude Oil	SANFRANCISCO, CA	SAUDI ARABIA	1034	1.1	38.8	PHILLIPS 66 CO
Jun-14	All Other Motor Gas B	LONG BEACH, CA	CANADA	60	0	0	TESORO LOGISTICS OPNS LLC
Jun-14	All Other Motor Gas B	LOS ANGELES, CA	SPAIN	74	0	0	UNKNOWN PROCESSOR-CA
Jun-14	All Other Motor Gas B	SANFRANCISCO, CA	SPAIN	228	0	0	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	COLOMBIA	210	1.61	19.3	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	COLOMBIA	351	1.53	19.2	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	ECUADOR	335	1.42	24.6	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	ECUADOR	353	1.43	24.6	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	ECUADOR	397	1.38	24.7	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	MEXICO	350	0.44	32.3	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	SAUDI ARABIA	163	0.98	40.1	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	SANFRANCISCO, CA	SAUDI ARABIA	359	0.96	40.2	UNKNOWN PROCESSOR-CA
Jun-14	Crude Oil	CARQUINEZ ST, CA	CANADA	1	2.46	39.4	VALERO REFINING CO CALIFOI
Jun-14	Crude Oil	CARQUINEZ ST, CA	COLOMBIA	453	1.72	19.4	VALERO REFINING CO CALIFOI
Jun-14	Crude Oil	CARQUINEZ ST, CA	IRAQ	208	2.18	29	VALERO REFINING CO CALIFOI
Jun-14	Crude Oil	CARQUINEZ ST, CA	IRAQ	398	2.18	28.9	VALERO REFINING CO CALIFOI
Jun-14	Crude Oil	CARQUINEZ ST, CA	IRAQ	399	2.18	28.4	VALERO REFINING CO CALIFOI
Jun-14	Crude Oil	NATRONA APRT, WY	CANADA	50	3.71	21	SUNCOR ENERGY USA INC
Jun-14	Crude Oil	NATRONA APRT, WY	CANADA	232	4.1	13.2	SUNCOR ENERGY USA INC
Jun-14	Crude Oil	NATRONA APRT, WY	CANADA	330	3.08	19.53	SUNCOR ENERGY USA INC
Jun-14	Crude Oil	DENVER, CO	CANADA	321	3.77	21.4	UNKNOWN PROCESSOR-CO
Jun-14	Crude Oil	DENVER, CO	CANADA	25	3.58	20.3	UNKNOWN PROCESSOR-CO
Jun-14	Crude Oil	DENVER, CO	CANADA	25	3.77	20.6	UNKNOWN PROCESSOR-CO
Jun-14	MGBC, Gasoline Trea	NEW HAVEN, CT	UNITED KINGDOM	80	0	0	GULF OIL LP
Jun-14	MGBC, Reformulated	NEW HAVEN, CT	UNITED KINGDOM	56	0	0	GULF OIL LP
Jun-14	MGBC, Reformulated	NEW HAVEN, CT	UNITED KINGDOM	186	0	0	GULF OIL LP
Jun-14	All Other Motor Gas B	NEW HAVEN, CT	FINLAND	100	0	0	UNKNOWN PROCESSOR-CT
Jun-14	All Other Motor Gas B	NEW HAVEN, CT	FINLAND	210	0	0	UNKNOWN PROCESSOR-CT
Jun-14	Crude Oil	PEMBINA, ND	CANADA	61	0.25	21	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	PEMBINA, ND	CANADA	61	0.25	21	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	PORT HURON, MI	CANADA	99	3.04	17	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	WILMINGTON, DE	BRAZIL	44	0.58	18.2	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	WILMINGTON, DE	IRAQ	109	3.17	29.2	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	WILMINGTON, DE	IRAQ	411	3.17	29.2	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	WILMINGTON, DE	MEXICO	199	1.7	15.7	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	WILMINGTON, DE	PERU	362	0.3	18.5	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	PEMBINA, ND	CANADA	360	3.04	17	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	PORTAL, ND	CANADA	2	3.04	17	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	INTER. FALLS,MN	CANADA	380	3.04	17	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	DETROIT, MI	CANADA	59	3.04	17	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	INTER. FALLS,MN	CANADA	102	3.19	12.3	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	PORT HURON, MI	CANADA	5	3.19	12.3	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	CHICAGO, IL	CANADA	51	2.02	32.6	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	CHICAGO, IL	CANADA	61	2.02	35.4	DELAWARE CITY REFINING CO
Jun-14	Crude Oil	CHICAGO, IL	CANADA	66	2.02	34.2	DELAWARE CITY REFINING CO

RPT_PER	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STA
Jul-14	All Other Motor Gas	CANADA	10	0	0	CHEVRON USA INC	RICHMOND CA	CA
Jul-14	All Other Motor Gas	CANADA	27	0	0	CHEVRON USA INC	RICHMOND CA	CA
Jul-14	All Other Motor Gas	SPAIN	130	0	0	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	COLOMBIA	295	1.42	19.3	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	COLOMBIA	379	1.61	25.3	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	COLOMBIA	512	1.43	26	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	ECUADOR	327	0.44	24.84	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	ECUADOR	344	1.92	24.9	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	MEXICO	349	1.53	32	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	SAUDI ARABIA	515	0.37	40.1	UNKNOWN PROCESSOR-CA	UNKNOWN PROCESSOR-CA	CA
Jul-14	Crude Oil	COLOMBIA	85	1.72	19.2	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	COLOMBIA	269	1.75	19.5	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	COLOMBIA	366	1.72	19.2	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	IRAQ	149	2.18	29.4	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	IRAQ	198	2.18	29.4	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	IRAQ	298	2.18	30.4	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	IRAQ	375	2.18	29.8	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	COLOMBIA	30	1.75	19.5	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Unfinished Oils, He	BELGIUM	374	0	0	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Jul-14	Crude Oil	CANADA	53	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Jul-14	Crude Oil	CANADA	263	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Jul-14	Crude Oil	CANADA	319	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Jul-14	Crude Oil	CANADA	26	3.58	20.3	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-CO	CO
Jul-14	Crude Oil	CANADA	26	3.77	20.5	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-CO	CO
Jul-14	MGBC, Reformulat	NETHERLANDS	141	0	0	GULF OIL LP	NEW HAVEN	CT
Jul-14	MGBC, Gasoline Tı	NETHERLANDS	101	0	0	MAGELLAN TERMINALS HOLDINGS LP	NEW HAVEN 85 EAST	CT
Jul-14	MGBC, Reformulat	NETHERLANDS	30	0	0	MAGELLAN TERMINALS HOLDINGS LP	NEW HAVEN 85 EAST	CT
Jul-14	MGBC, Reformulat	NETHERLANDS	152	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING TERMI	CT
Jul-14	MGBC, Reformulat	RUSSIA	21	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
Jul-14	MGBC, Reformulat	CANADA	2	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
Jul-14	MGBC, Reformulat	FRANCE	80	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
Jul-14	MGBC, Reformulat	INDIA	1	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
Jul-14	All Other Motor Gas	BELGIUM	69	0	0	UNKNOWN PROCESSOR-CT	UNKNOWN PROCESSOR-CT	CT
Jul-14	All Other Motor Gas	FRANCE	47	0	0	UNKNOWN PROCESSOR-CT	UNKNOWN PROCESSOR-CT	CT
Jul-14	All Other Motor Gas	NETHERLANDS	12	0	0	UNKNOWN PROCESSOR-CT	UNKNOWN PROCESSOR-CT	CT
Jul-14	All Other Motor Gas	RUSSIA	23	0	0	UNKNOWN PROCESSOR-CT	UNKNOWN PROCESSOR-CT	CT
Jul-14	All Other Motor Gas	UNITED KINGDOM	15	0	0	UNKNOWN PROCESSOR-CT	UNKNOWN PROCESSOR-CT	CT
Jul-14	All Other Motor Gas	PORTUGAL	42	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	All Other Motor Gas	SPAIN	79	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	All Other Motor Gas	CANADA	128	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	CANADA	448	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	BRAZIL	298	0.83	16.3	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	MEXICO	213	4.1	15.7	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	CANADA	606	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	CANADA	101	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	CANADA	2	3.23	14.05	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Jul-14	Crude Oil	CANADA	2	3.91	11.26	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE

RPT_PERIO	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_ST
Aug-14	Crude Oil	SAUDI ARABIA	352	1.9	33	CHEVRON USA INC	RICHMOND	CA
Aug-14	Crude Oil	SAUDI ARABIA	554	1.9	32.9	CHEVRON USA INC	RICHMOND	CA
Aug-14	Unfinished Oils, Heavy	ALGERIA	383	0	0	CHEVRON USA INC	RICHMOND	CA
Aug-14	Unfinished Oils, Heavy	ALGERIA	374	0	0	CHEVRON USA INC	RICHMOND	CA
Aug-14	All Other Motor Gas Ble	JAPAN	53	0	0	CHEVRON USA INC	RICHMOND CA	CA
Aug-14	All Other Motor Gas Ble	CANADA	37	0	0	CHEVRON USA INC	RICHMOND CA	CA
Aug-14	Unfinished Oils, Heavy	INDIA	70	0	0	TESORO CORP	WILIMINGTON LOS ANGELES	CA
Aug-14	Crude Oil	CANADA	202	3.54	21.9	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	COLOMBIA	22	1.75	19.5	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	COLOMBIA	278	1.75	19.5	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	ECUADOR	343	1.27	24.7	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	IRAQ	117	2.18	26.8	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	IRAQ	250	2.18	26.9	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	IRAQ	350	2.18	29.6	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	IRAQ	415	2.18	26.8	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Unfinished Oils, Heavy	INDIA	215	0	0	VALERO REFINING CO CALIFORNIA	WILMINGTON REFINERY	CA
Aug-14	Crude Oil	CANADA	50	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Aug-14	Crude Oil	CANADA	266	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Aug-14	Crude Oil	CANADA	302	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Aug-14	Crude Oil	CANADA	26	3.58	19.8	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-CO	CO
Aug-14	Crude Oil	CANADA	26	3.77	20.3	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOR-CO	CO
Aug-14	MGBC, Reformulated B	NETHERLANDS	214	0	0	GULF OIL LP	NEW HAVEN	CT
Aug-14	MGBC, Reformulated B	CANADA	165	0	0	MAGELLAN TERMINALS HOLDINGS LP	NEW HAVEN 3	CT
Aug-14	All Other Motor Gas Ble	PORTUGAL	159	0	0	MAGELLAN TERMINALS HOLDINGS LP	NEW HAVEN 85 EAST	CT
Aug-14	MGBC, Reformulated B	NETHERLANDS	60	0	0	MAGELLAN PIPELINE CO LP	NEW HAVEN FORBES	CT
Aug-14	All Other Motor Gas Ble	RUSSIA	79	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	All Other Motor Gas Ble	SPAIN	104	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	COLOMBIA	236	1.99	23.5	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	811	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	188	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	211	3.04	17	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	24	3.96	11.21	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	10	3.96	11.21	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	6	3.91	11.26	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	10	3.23	14.05	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	122	3.19	12.8	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	13	3.19	12.8	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	55	2.02	33.9	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	53	2.02	31.7	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	54	2.02	31.2	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	62	2.02	30.4	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	67	2.02	29.3	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	68	2.02	30.3	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Crude Oil	CANADA	69	2.02	30.4	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	CANADA	176	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	FRANCE	27	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	LIBYA	308	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	RUSSIA	8	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	RUSSIA	100	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE
Aug-14	Unfinished Oils, Residu	RUSSIA	175	0	0	DELAWARE CITY REFINING CO LLC	DELAWARE CITY	DE

RPT_PERI	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_ST
Sep-14	Unfinished Oils, Heavy Gas Oils	INDIA	530	0	0	CHEVRON USA INC	RICHMOND	CA
Sep-14	All Other Motor Gas Blending Co	CANADA	18	0	0	CHEVRON USA INC	RICHMOND CA	CA
Sep-14	Crude Oil	ECUADOR	360	0.5	34.9	PHILLIPS 66 CO	SAN FRANCISCO	CA
Sep-14	Crude Oil	SAUDI ARABIA	550	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Sep-14	Unfinished Oils, Heavy Gas Oils	INDIA	241	0	0	PHILLIPS 66 CO	SAN FRANCISCO	CA
Sep-14	Crude Oil	CANADA	128	1.09	21.7	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	COLOMBIA	300	1.75	19.6	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	ECUADOR	139	2.07	20.6	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	IRAQ	151	2.18	27.3	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	IRAQ	182	2.46	26.7	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	IRAQ	251	1.09	29.5	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	IRAQ	349	2.18	29.5	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	IRAQ	395	2.18	30.1	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Unfinished Oils, Heavy Gas Oils	BELGIUM	68	0	0	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Unfinished Oils, Heavy Gas Oils	BELGIUM	308	0	0	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Unfinished Oils, Heavy Gas Oils	RUSSIA	35	0	0	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Unfinished Oils, Heavy Gas Oils	RUSSIA	332	0	0	VALERO REFINING CO CALIFOR	WILMINGTON REFINE	CA
Sep-14	Crude Oil	CANADA	333	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
Sep-14	Crude Oil	CANADA	357	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WE	CO
Sep-14	Crude Oil	CANADA	623	3.77	21	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESS	CO
Sep-14	Crude Oil	CANADA	25	3.58	20.2	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESS	CO
Sep-14	Crude Oil	CANADA	26	3.77	19.9	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESS	CO
Sep-14	MGBC, Reformulated Blendstock	NETHERLANDS	94	0	0	GULF OIL LP	NEW HAVEN	CT
Sep-14	MGBC, Reformulated Blendstock	NETHERLANDS	122	0	0	GULF OIL LP	NEW HAVEN	CT
Sep-14	MGBC, Reformulated Blendstock	RUSSIA	15	0	0	GULF OIL LP	NEW HAVEN	CT
Sep-14	MGBC, Reformulated Blendstock	RUSSIA	20	0	0	GULF OIL LP	NEW HAVEN	CT
Sep-14	MGBC, Reformulated Blendstock	DENMARK	6	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	MGBC, Reformulated Blendstock	FINLAND	6	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	MGBC, Reformulated Blendstock	GERMANY	6	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	MGBC, Reformulated Blendstock	NETHERLANDS	22	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	MGBC, Reformulated Blendstock	UNITED KINGDOM	8	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	MGBC, Reformulated Blendstock	CANADA	73	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 3	CT
Sep-14	All Other Motor Gas Blending Co	NETHERLANDS	79	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 85 EAST	CT
Sep-14	All Other Motor Gas Blending Co	NETHERLANDS	100	0	0	MAGELLAN TERMINALS HOLDIN	NEW HAVEN 85 EAST	CT
Sep-14	MGBC, Reformulated Blendstock	NETHERLANDS	64	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDIN	CT
Sep-14	MGBC, Reformulated Blendstock	RUSSIA	11	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDIN	CT
Sep-14	All Other Motor Gas Blending Co	PERU	89	0	0	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	54	0.25	21	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	IRAQ	150	2.88	29	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	62	2.72	22.7	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	1	3.91	11.26	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	43	3.96	11.21	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	70	3.19	12.4	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	66	1.46	32.5	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	96	2.02	33.5	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	53	2.02	32.3	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE
Sep-14	Crude Oil	CANADA	59	2.02	33	DELAWARE CITY REFINING CO I	DELAWARE CITY	DE

RPT_PERIC	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
Oct-14	Unfinished Oils, Heav	INDIA	530	0	0	CHEVRON USA INC	RICHMOND	CA
Oct-14	All Other Motor Gas B	CANADA	18	0	0	CHEVRON USA INC	RICHMOND CA	CA
Oct-14	Crude Oil	SAUDI ARABIA	499	1.1	31.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Oct-14	Unfinished Oils, Heav	NORWAY	115	0	0	TESORO LOGISTICS OPNS LL	TERMINAL 2	CA
Oct-14	Unfinished Oils, Heav	NORWAY	258	0	0	EXXONMOBIL REFINING & SP	TORRANCE	CA
Oct-14	Crude Oil	COLOMBIA	37	0.72	25.5	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	COLOMBIA	301	1.75	19.9	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	COLOMBIA	443	0.72	25.5	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	IRAQ	248	2.18	27.1	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	IRAQ	347	2	27.2	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	IRAQ	400	2.18	27.2	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	RUSSIA	52	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	RUSSIA	60	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	RUSSIA	271	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	SWEDEN	54	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	UNITED KINGDOM	60	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	UNITED KINGDOM	300	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	KAZAKHSTAN	275	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Unfinished Oils, Heav	RUSSIA	45	0	0	VALERO REFINING CO CALIF(	WILMINGTON REFINEI	CA
Oct-14	Crude Oil	CANADA	150	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
Oct-14	Crude Oil	CANADA	485	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
Oct-14	Crude Oil	CANADA	101	3.71	21	SUNCOR ENERGY USA INC	COMMERCE CITY WES	CO
Oct-14	Crude Oil	CANADA	259	3.77	20	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESS(	CO
Oct-14	Crude Oil	CANADA	25	3.58	19.8	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESS(	CO
Oct-14	MGBC, Gasoline Trea	NETHERLANDS	135	0	0	GULF OIL LP	NEW HAVEN	CT
Oct-14	MGBC, Reformulated	NETHERLANDS	71	0	0	GULF OIL LP	NEW HAVEN	CT
Oct-14	MGBC, Reformulated	PORTUGAL	20	0	0	GULF OIL LP	NEW HAVEN	CT
Oct-14	MGBC, Reformulated	PORTUGAL	150	0	0	GULF OIL LP	NEW HAVEN	CT
Oct-14	MGBC, Conventional	NETHERLANDS	25	0	0	MAGELLAN TERMINALS HOLD	NEW HAVEN 3	CT
Oct-14	MGBC, Reformulated	PORTUGAL	25	0	0	MAGELLAN TERMINALS HOLD	NEW HAVEN 3	CT
Oct-14	MGBC, Reformulated	PORTUGAL	126	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDIN	CT
Oct-14	All Other Motor Gas B	VENEZUELA	108	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	All Other Motor Gas B	CONGO (BRAZZAV	25	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	All Other Motor Gas B	CONGO (BRAZZAV	51	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	All Other Motor Gas B	NIGERIA	67	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	All Other Motor Gas B	RUSSIA	160	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	All Other Motor Gas B	VENEZUELA	50	0	0	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	COLOMBIA	105	3.08	15.7	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	COLOMBIA	114	3.08	16.4	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	COLOMBIA	311	3.08	17.7	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	GUATEMALA	226	3	15.5	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	1	3.91	11.26	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	54	3.91	11.26	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	43	3.55	12.6	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	84	3.55	12.6	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	47	4.46	32	DELAWARE CITY REFINING C(	DELAWARE CITY	DE
Oct-14	Crude Oil	CANADA	49	1.46	31.5	DELAWARE CITY REFINING C(	DELAWARE CITY	DE

RPT_PERIO	PROD_NAME	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	PCOMP_RNAM	PCOMP_SNAM	PCOMP_STAT
Nov-14	Unfinished Oils, H	ITALY	381	0	0	CHEVRON USA INC	RICHMOND	CA
Nov-14	All Other Motor G	CANADA	10	0	0	CHEVRON USA INC	RICHMOND CA	CA
Nov-14	Crude Oil	ECUADOR	334	0.77	28.7	PHILLIPS 66 CO	SAN FRANCISCO	CA
Nov-14	Crude Oil	SAUDI ARABIA	639	1.1	38.8	PHILLIPS 66 CO	SAN FRANCISCO	CA
Nov-14	Unfinished Oils, H	SINGAPORE	282	0	0	EXXONMOBIL REFINING & SPI	TORRANCE	CA
Nov-14	Crude Oil	BRAZIL	597	0.37	30	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	IRAQ	154	4	26.4	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	IRAQ	280	4	26.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	IRAQ	327	4	26.4	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	IRAQ	407	4	26.5	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	IRAQ	785	4	26.4	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	MEXICO	249	2	32.5	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	SAUDI ARABIA	50	1	39.8	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	SAUDI ARABIA	384	2	33.2	TESORO CORP	WILIMINGTON LOS ANGE	CA
Nov-14	Crude Oil	COLOMBIA	301	1.75	20.2	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Crude Oil	IRAQ	70	2	26.3	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Crude Oil	IRAQ	131	2.18	26.3	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Crude Oil	IRAQ	392	2	26.4	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Crude Oil	IRAQ	403	2	26.3	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Unfinished Oils, H	ECUADOR	203	0	0	VALERO REFINING CO CALIFO	WILMINGTON REFINERY	CA
Nov-14	Crude Oil	CANADA	256	3.08	19.53	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Nov-14	Crude Oil	CANADA	274	0.1	32	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Nov-14	Crude Oil	CANADA	61	0.5	38	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Nov-14	Crude Oil	CANADA	189	4.1	13.2	SUNCOR ENERGY USA INC	COMMERCE CITY WEST	CO
Nov-14	Crude Oil	CANADA	155	3.77	20.7	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	60	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	60	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	62	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	62	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	62	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	62	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	63	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	63	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	60	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	Crude Oil	CANADA	59	3.54	23.6	UNKNOWN PROCESSOR-CO	UNKNOWN PROCESSOF	CO
Nov-14	MGBC, Reformul	BELGIUM	128	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	RUSSIA	22	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	SWEDEN	70	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	UNITED KINGDOM	40	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	ALGERIA	7	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	BELGIUM	7	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	NORWAY	9	0	0	GULF OIL LP	NEW HAVEN	CT
Nov-14	MGBC, Reformul	CANADA	265	0	0	MAGELLAN TERMINALS HOLD	NEW HAVEN 3	CT
Nov-14	MGBC, Gasoline	BELGIUM	4	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING	CT
Nov-14	MGBC, Gasoline	GERMANY	68	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING	CT
Nov-14	MGBC, Gasoline	NETHERLANDS	43	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING	CT
Nov-14	MGBC, Gasoline	NORWAY	10	0	0	MOTIVA ENTERPRISES LLC	NEW HAVEN BLENDING	CT

Attachment K3-2
Sandu and Wright, 2013. *Hydrocarbon Processing*

HYDROCARBON PROCESSING

Innovative solutions for processing shale oils

07.01.2013 | **Sandu, C.**, Baker Hughes, Sugar Land, Texas; **Wright, B.**, Baker Hughes, Sugar Land, Texas

New monitoring protocols can provide advance warning of any negative aspects of shale oil processing, thus enabling the refiner to take corrective measures early.

Keywords:

The refining of shale oil (also known as tight oil) extracted through fracturing from fields such as Eagle Ford, Utica and Bakken has become prevalent in many areas of the US. Although these oils are appealing as refinery feedstocks due to their availability and low cost, processing can be more difficult.

The quality of the shale oils is highly variable. These oils can be high in solids with high melting point waxes. The light paraffinic nature of shale oils can lead to asphaltene destabilization when blended with heavier crudes. These compositional factors have resulted in cold preheat train fouling, desalter upsets, and fouling of hot preheat exchangers and furnaces. Problems in transportation and storage, finished-product quality, as well as refinery corrosion, have also been reported. Operational issues have led to cases of reduced throughput and crude unit shutdowns. The problems encountered with shale oil processing and possible prediction and control strategies will be presented.

NEW RESOURCES

The production of shale gas and oils has increased rapidly due to significant advancements in drilling technology and hydraulic fracturing. Coupling chemical treatments to the mechanical drilling capabilities has enabled increased production efficiency.

In September 2012, shale oil production was reported to be nearly 1 million bpd (1 MMbpd). The most prolific production locations are in North Dakota (Bakken), Texas (Eagle Ford), Ohio, Pennsylvania (Marcellus and Utica), Colorado, Kansas, Nebraska and Wyoming (Niobrara). Other locations identified for probable shale oil production are in New Mexico, Oklahoma and Utah. By 2020, production will be at least 10 MMbpd, based on expanded drilling activity, as shown in **Fig. 1.**[1] The predictions are largely dependent on the volatility of oil prices, technical advancements, capital expenditure, infrastructure needs, and challenges associated with the processing of these abundant resources.

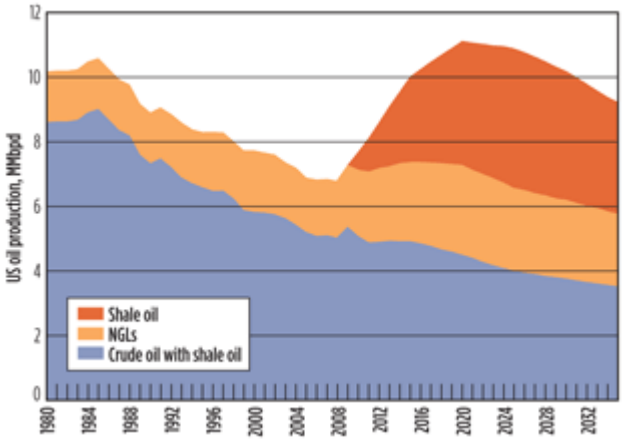

Fig. 1. Forecast prediction of US oil production. Source: EIA.

The properties of shale oils are significantly different than typical crude oils. As a result, a series of challenges needs to be solved to ensure uninterrupted transportation and refining of shale oils. The main challenges encountered with these feed streams will be discussed, including issues in storage, transportation, refining and finished fuel quality.

PHYSICAL AND CHEMICAL CHARACTERISTICS

Unlike most crude oils, shale oils are light, sweet oils, with a high paraffinic content and low acidity. They also have minimal asphaltenic content phase and varying contents of filterable solids, hydrogen sulfide (H_2S) and mercaptans. **Table 1** is a comparison of the oil characteristics typical for shale oil, and it includes data for Eagle Ford and Bakken shale oils.[2] There are significant differences in the sulfur content and the filterable solids loading. In addition, the streams from a shale oil production region can have significant variability, as shown in **Fig. 2.** These were shale oil samples from one field, with colors ranging from pale amber to black.

TABLE 1. Eagle Ford and Bakken shale oil property comparison

Parameter	Eagle Ford	Bakken
API	52	40.8
TAN, g KOH/g	< 0.05	0.09
Sulfur, wt%	< 0.2	0.304
Asphaltene, wt%	0.1	0.41
Resin, wt%	1.6	4.95
Filterable solids, PTB	225	76

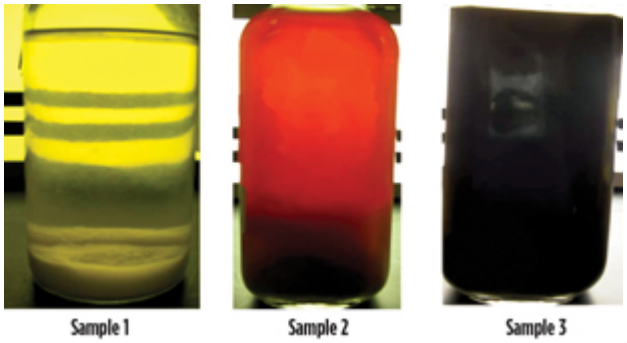

Fig. 2. Color variation of Eagle Ford shale oil.

Solids loading of samples from a single producing region can be highly variable and associated with the stage of fracturing and production from which the oil is produced. **Table 2** shows typical analytical results on the three shale oil samples from **Fig. 1.** Filterable solids ranged from 176 pounds per thousand barrels (PTB) to 295 PTB.

TABLE 2. Physical properties of Eagle Ford shale oil samples

Parameter	Yellow	Red	Black
API	55	44.6	52.3
TAN, g KOH/g	< 0.05	0.07	< 0.05
Sulfur, wt%	< 0.2	< 0.2	< 0.2
Na, ppm	1	1.6	1.6
K, ppm	0.3	0.4	0.5
Mg, ppm	3.4	2.9	3
Ca, ppm	2.6	2.8	3.8
Asphaltenes, wt%	0	0	0.1
Resin, wt%	0.5	3.2	1.6
Filterable solids, PTB	176	295	225

Paraffin. The paraffin content of shale oil is one of the main properties that contributes to downstream problems from transportation and storage to refinery processing. Analyses of one batch of shale oil revealed paraffin chains containing well over 50 carbons. Similar paraffin analyses have been observed from multiple shale oils. To understand fouling due to wax deposition, a carbon-chain profile analysis should be performed to document the molecular-weight distribution (MWD) and the melting points of the waxes in the system. **Fig. 3** illustrates the characterization of waxes from Eagle Ford and Bakken oil samples. Some samples of Eagle Ford shale oil contain over 70 carbon paraffins.

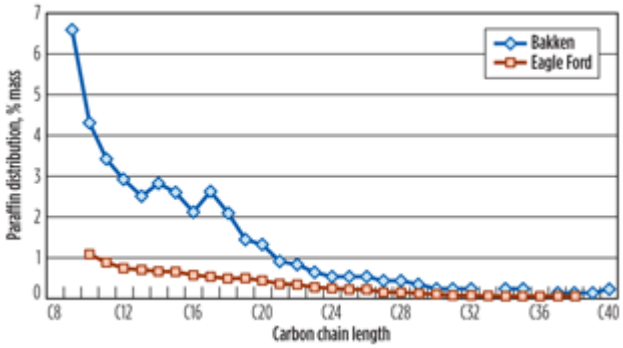

Fig. 3. Paraffin chain distribution for Bakken and Eagle Ford shale oils.

Due to their paraffinic nature, mixing shale oil with asphaltenic oil leads to destabilization of the asphaltene cores. Asphaltenes are polar compounds that influence emulsion stability. Once the asphaltenes destabilize, they can agglomerate, leading to larger macro-molecules. On hot surfaces, agglomerated asphaltenes easily crack or dehydrogenate and gradually form coke-like deposits.

Several shale oil production locations have high H_2S loading. To ensure worker safety, scavengers are often used to reduce H_2S concentrations. The scavengers are often amine-based products-—methyl triazine, for instance—that are converted into mono-ethanolamine (MEA) in the crude distillation unit (CDU). Unfortunately, these amines contribute to corrosion problems in the CDU. Once MEA forms, it rapidly reacts with chlorine to form chloride salts. These salts lose solubility in the hydrocarbon phase and become solids at the processing temperatures of the atmospheric CD towers and form deposits on the trays or overhead system. The deposits are hygroscopic, and, once water is absorbed, the deposits become very corrosive. These physical properties are responsible for the problems that are being experienced by refineries handling shale oils.

Extraction and production

The challenges associated with the production of shale oils are a function of their compositional complexities and the varied geological formations where they are found. These oils are light, but they are very waxy and reside in oil-wet formations. These properties create some of the main difficulties associated with shale oil extraction. Such problems include scale formation, salt deposition, paraffin wax deposits, destabilized asphaltenes, corrosion and bacteria growth. Multi-component chemical additives are added to the stimulation fluid to control these problems.

Shale oils are characterized by low-asphaltenic content, low-sulfur content and a significant MWD of the paraffinic wax content. Paraffin carbon chains of C10 to C60 have been found, with some shale oils containing carbon chains up to C72. To control deposition and plugging in formations due to paraffins, the dispersants are commonly used. In upstream applications, these paraffin dispersants are applied as part of multifunctional additive packages where asphaltene stability and corrosion control are also addressed simultaneously.

Scale deposits of calcite, carbonates and silicates must be controlled during production or plugging problems arise. A wide range of scale additives is available. These additives can be highly effective when selected appropriately. Depending on the nature of the well and the operational conditions, a specific chemistry is recommended or blends of products are used to address scale deposition.

Storage and transportation

Another challenge encountered with shale oil is the transportation infrastructure. Rapid distribution of shale oils to the refineries is necessary to maintain consistent plant throughput. Some pipelines are in use, and additional pipelines are being constructed to provide consistent supply. During the interim, barges and railcars are being used, along with a significant expansion in trucking to bring the various shale oils to the refineries. Eagle Ford production is estimated to increase by a factor of 6—from 350,000 bpd to nearly 2 MMbpd by 2017; more reliable infrastructures are needed to distribute this oil to multiple locations. Similar expansion is estimated for Bakken and other shale oil production fields.

The paraffin content of the shale oils is impacting all transportation systems. Wax deposits have been found to coat the walls of railroad tank cars, barges and trucks. Waxy deposits in pipelines regularly require pigging to maintain full throughput. Bakken shale oil is typically transported in railcar, although pipeline expansion projects are in progress to accommodate the long-term need. These railcars require regular steaming and cleaning for reuse. Similar deposits are being encountered in trucks being used for shale oil transportation. The wax deposits also create problems in transferring the shale oils to refinery tankage. **Fig. 4** shows samples of deposited wax collected from pigged pipelines in shale oil service.

Fig. 4. Waxy deposits removed from shale oil pipelines.

Multiple chemical and mechanical solutions are used to mitigate these deposit problems. A combination of chemical-additive treatment solutions involving paraffin dispersants and flow drag-reducer technologies has proven to be effective in pipeline applications. Wax dispersants and wash solvents have been used to clean transportation tanks and refinery storage vessels. In the case of pipeline fouling management, a combination of these technologies, coupled with frequent pigging, are the main means to mitigate wax deposition. Preventive fouling control programs have been developed to manage the wax deposition occurring in storage tanks. By injecting the proper chemical treatment to control wax buildup in storage tanks, the production field and refinery can handle and transfer larger quantities of oil without significant plugging issues.

One other problem encountered in storing and transporting shale oils is the concentrations of light ends that accumulate in the vapor spaces, requiring increased safety and relief systems. Shipping Bakken crude via barges was challenged by the increased levels of volatile organic compounds (VOCs). Vapor-control systems should be used to ensure a safe environment.

Due to the paraffinic nature of shale oils and their lack of heavy bottoms, most refineries mix crude oil with the shale oil. Unfortunately, the shale oils have low aromatic content, so mixing with conventional crude oil often leads to asphaltene destabilization. If blended oils are transported, the deposits can consist of waxes and precipitated asphaltenes. Dispersants specifically designed for both hydrocarbon types can control deposit formation during transportation. Until a proper transportation infrastructure is built, significant variation of shale oil shipments and potential for contamination are still possible. Refineries are already experiencing the impact of the quality variation of shale oil feeds, and of processing challenges.

REFINERY IMPACTS

Due to the variation in solids loading and their paraffinic nature, processing shale oils in refinery operations offers several challenges. Problems can be found from the tank farm to the desalter, preheat exchangers and furnace, and increased corrosion in the CDU. In the refinery tank farm, entrained solids can agglomerate and rapidly settle, adding to the sludge layer in the tank bottoms. Waxes crystalize and settle or coat the tank walls, thus reducing storage capacity. Waxes will stabilize emulsions and suspend solids in the storage tanks, leading to slugs of sludge entering the CDU. Waxes will also coat the transfer piping, resulting in increased pressure drop and hydraulic restrictions.

Mixing asphaltenic crude with paraffinic shale oils leads to asphaltene destabilization that contributes to stable emulsions and sludge formation. To control these problems, wax-crystal modifiers or paraffin dispersants can be applied successfully. Wax-crystal modifiers must be added when the shale oil is still hot from the formation. When the paraffins begin to leave the liquid phase, wax modifiers are ineffective, and paraffin dispersants are required to control deposition.

Desalter operations may suffer from issues related to the shale oil properties. Solids loading can be highly variable, leading to large shifts in solids removal performance. Sludge layers from the tank farm may cause severe upsets, including growth of stable emulsion bands and intermittent increases of oil in the brine water. Agglomerated asphaltenes can enter from storage tanks or can flocculate in the desalter rag layer, leading to oil slugs in the effluent brine.

Solutions include using tank farm additives to control the formation of sludge layers, along with specially designed asphaltene dispersants and aggressive desalter treatments to ensure optimum operation. Pretreatment, coupled with high-performance desalter programs, have provided the best overall desalter performance and desalted crude quality; multiple treatment options for both areas can ensure maximum performance. **Fig. 5** is an example of applying a tank pretreatment. A crude-oil tank treatment program was initiated that broke waxy emulsions in tankage, enabling improved water resolution of the raw crude oil and minimizing sludge and solids entering the desalter. This program provided significant improvement of solids released into the desalter brine water compared to previous operations. Prior to initiating the pretreatment program, solids in the brine averaged 29 PTB, and the emulsion band control was sporadic. After the tank pretreatment program started, the desalter emulsion band could be controlled with the emulsion breaker program, and solids removal to the brine water increased by a factor of 8 to an average of 218 PTB.

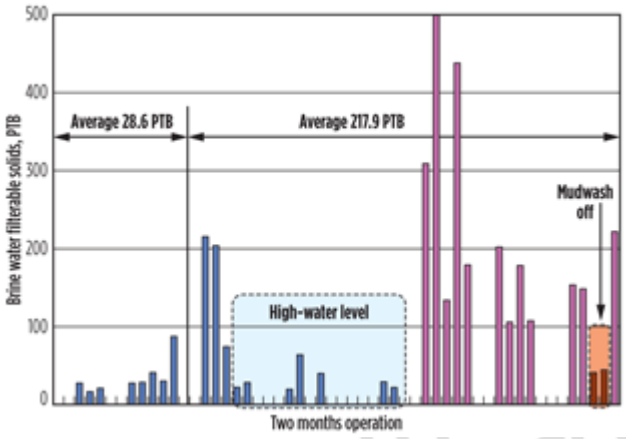

Fig. 5. Tank pretreatment impact on desalter filterable solids.

Preheat exchanger fouling has been observed in the cold train before the desalters and in the hot train after the desalters. Cold train fouling results from the deposition of insoluble paraffinic hydrocarbons, coupled with agglomerated inorganic solids. Solutions to cold train exchanger fouling include the addition of wax dispersants and other oil management best practices to ensure consistent solids loading with minimum sludge processing.[a] Crude oil management can include additives to stabilize asphaltenes and surfactants that resolve emulsions and improve water separation.[a] These practices also include proactive asphaltene stability testing to ensure that the crude blends to be processed retain an acceptable compatibility level.

Hot train fouling occurs from destabilized asphaltenes that agglomerate and form deposits. These materials entrain inorganics, such as iron sulfide and sediments from production formations, into the deposit matrix. Some deposits, including high molecular-weight paraffins, become complex with the asphaltene aggregates. Mixing shale oils with asphaltenic crude oils results in rapid asphaltene agglomeration. Rapid hot train exchanger fouling has been seen in units running crude blends with asphaltene concentrations of 1% or less. **Table 3** shows the analysis from a hot exchanger deposit that had to be shut down for cleaning after only a short time online. This hydrogen-to-carbon ratio is consistent with asphaltenic deposits.

TABLE 3. Hot train exchanger deposit analyses of shale oil with asphaltenic crudes in wt%

Sample	C	H	N	O	Cl	Fe	S	H/C atomic ratio	Ash	Summary
Exchanger 1-crude side	82	8	1	2	1		6	1.16	1	Asphaltenes
Exchanger 2-crude side	78	7	1	4	1	1	8	1.07	3	Asphaltenes
Exchanger 3-crude side	81	8	1	2	1		7	1.18	3	Asphaltenes

Feed analyses of the shale oil and crude blend being processed revealed poor stability of the asphaltenes. Asphaltene stability tests are used to measure the ability of a crude oil blend to hold asphaltenes in solution.[3, a] The method utilizes light scattering, coupled with automatic titration, to force asphaltene destabilization and agglomeration.

As titration begins, the oil becomes less opaque and the light intensity increases. When the destabilization point is reached and the asphaltenes rapidly agglomerate and flocculate, the fluid opacity suddenly increases. Inflection points on the curve show where asphaltenes become unstable: farther to the right indicates higher stability asphaltenes, while inflection points farther to the left suggest unstable asphaltenes. **Fig. 6** shows asphaltene stability results for several crude blends, along with a test on Eagle Ford shale oil. An inflection point was not achieved for the shale oil because it has no asphaltenes to flocculate. Typical crude oils are shown, with asphaltene stability index (ASI) results around 120. When the shale oil was blended with the typical crude oils at a ratio of 80/20, the measured asphaltene stability result was less than 30, indicating rapid and uncontrollable destabilization of the asphaltenes.

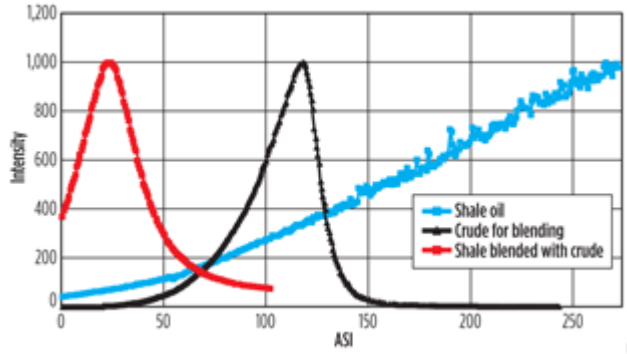

Fig. 6. Asphaltene stability index testing of shale oil and shale oil/crude blends.

If the asphaltenes in the crude blend were not being rapidly destabilized, the asphaltene stability would have been well above 120. This data shows that mixing certain crude oils with shale oil can result in rapid asphaltene deposition. New technology can provide the capability to rapidly perform asphaltene stability measurements onsite with a high degree of accuracy.[4, a]

Hot-train exchanger fouling can be controlled through antifoulant additives designed to control the agglomeration and deposition of asphaltenes and entrained inorganic solids. Another fouling control strategy is to do regular analysis of the stability of the asphaltenes in the crude oil blend under consideration for processing. This information can guide operations to minimize fouling problems.

CDU atmospheric furnace fouling has also been observed at several refineries processing shale oils, especially those processing a blend of asphaltenic crude and shale oils. In some cases, the fouling rate was so severe that the crude unit had to be shut down for furnace pigging. CDU furnace operations with conventional crude oils experience little to no fouling, and these furnaces can easily run for 5 to 6 years between turnarounds. **Fig. 7** shows the rate of fouling in a unit processing a mixture of shale oil with crude vs. the rate of fouling with more typical crude feeds.

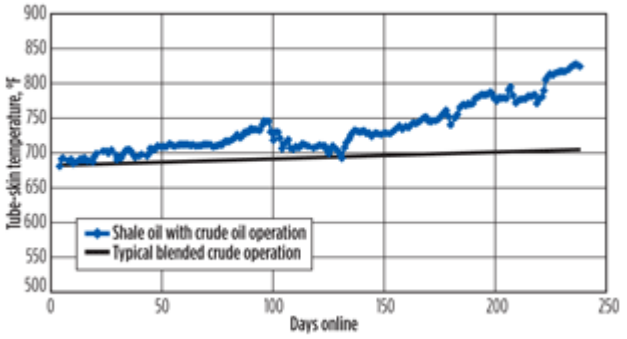

Fig. 7. Atmospheric furnace skin temperature trends.

Depending on the asphaltene stability of the shale oil/crude oil blend, the furnace skin temperatures can climb by 0.5°F/day to 2°F/day vs. more typical operations of 0.1°F or less. To control furnace fouling when processing shale oils blended with various crude oils, constant monitoring of the asphaltene destabilization potential is required.

Setting a minimum limit on the ASI ensures that the majority of the asphaltenes stay in solution. This limit should be developed for each unit, based on correlations between the rate of furnace fouling being experienced and the stability index. Using appropriate antifoulant additives can control agglomeration of asphaltenes and disperse offending materials into the bulk oil phase.

Shale oils often contain high concentrations of H_2S that require treatment with scavengers due to safety purposes. Amine-based scavengers often decompose as the crude oil is preheated through the hot preheat train and furnace, forming amine fragments. MEA, one of the most commonly used amines, readily forms an amine-chloride salt in the atmospheric tower. These salts deposit in the upper sections. Often, under-deposit corrosion is the major cause of failures in process systems because CDU tower under-salt corrosion rates can be 10 to 100 times faster than a general acidic attack. Mitigation strategies include controlling chloride to minimize the chloride traffic in the tower top and overhead, increasing the overhead operating temperature so that the salts move further downstream in the overhead system, and acidifying the desalter brine water to increase removal of amines into the water phase.

Finished fuels

The quality of the finished fuels from refining shale oils has changed significantly. As the shale oils have higher light-ends content, one benefit is increased production of naphtha for gasoline, and stable diesel and jet distillates. These increased volumes can boost refinery margins. However, due to the chemical nature of these shale oil feeds, several challenges can be encountered. The streams are more paraffinic—thus, they suffer from poor pour and cloud-point properties. In addition, shale oils are lower in sulfur content, so the need for lubricity additives is anticipated. Effective additives can be used to improve all distillate stream properties. Conductivity can also be off-spec; a combination of lubricity/conductivity improvers can raise the quality of the distillate. To optimize chemical treatment program, testing on specific product streams is required and suitable product selection should be customized. **Table 4** summarizes the main issues identified for different distillate cuts that a refiner can experience as well as chemical and mechanical solutions that can mitigate these challenges.

TABLE 4. Possible problems and solutions for finished fuels from shale-oil processing

Distillate	Challenge	Solutions
Light ends (C_3–C_4)	Copper strip corrosion	Corrosion inhibitors
Naphtha	Water shedding, corrosion	Corrosion inhibitors, microbial control
Jet fuel	Lubricity, conductivity, water shedding, stability	Various lubricity additives, filtration devices, dry solid systems, microbial control
Diesel	Lubricity, conductivity, stability, water shedding	Various lubricity additives, de-hazers, microbial control
Residual fuel oil	Asphaltene instability, gum deposits	Blending and compatibility monitoring
		Asphaltene stabilizers
		Paraffin dispersants

Preparing to process shale oils. The risks that shale oils present can be successfully managed. The first step is to identify the onset of all concerns. To be prepared for processing shale oils, monitoring protocols can provide advance warning of any negative aspects of shale oil processing and the impacts on product quality, thus enabling the refiner to take corrective measures early. **HP**

ACKNOWLEDGMENT

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NOTES

[a] CRUDE OIL MANAGEMENT, ASIT and FIELD ASIT SERVICES are trademarks of Baker Hughes Incorporated.

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The authors

Bruce Wright, a Baker Hughes senior technical support engineer for downstream chemicals, is based in Sugar Land, Texas, and specializes in the hydrocarbon processing industries. With more than 30 years of industry experience, he is involved in technical support and troubleshooting of refinery fouling problems. Mr. Wright has experience as a product development research scientist and also in environmental, health and safety compliance. He is an inventor or co-inventor on eight US patents and has published nine technical papers. Mr. Wright is a 1977 graduate of the Rensselaer Polytechnic Institute with a BS degree in chemical engineering. He also holds an MBA degree from the University of Houston. Mr. Wright is a registered professional engineer in the state of Texas, and is a member of the American Institute of Chemical Engineers.

Dr. Corina Sandu, a Baker Hughes R&D manager for downstream chemicals, is responsible for leading a team of scientists who are researching and developing upgraded and novel technologies to increase refinery industry processing performance. She is located in Sugar Land, Texas. Dr. Sandu holds a PhD in materials chemistry from the University of Houston, and a post-doctorate from Rice University. She is a member of the American Chemical Society and the Society of Petroleum Engineers. Dr. Sandu has authored and co-authored 24 publications in peer-reviewed journals and holds five patents.

Charles Harry
07.19.2013

The addition of mbp needs or usage would be useful relative to Fig.1 in regards to why there is an ongoing large increase in shale oil production followed by it gradual decline.

Peter LoGiudice
07.10.2013

Excellent well thoughtout overview-Thanks

Joseph
07.03.2013

What will be the typical Calorific Value of Shale oil in Kcal/ Kg? C/H2 Ratio
Any estimation of Metal Contents like Vanadium, Na, Si etc

Attachment K3-3
USEIA, 2014. ***US Crude Oil Production Forecast–Analysis of Crude Types***

Independent Statistics & Analysis
U.S. Energy Information Administration

U.S. Crude Oil Production Forecast-Analysis of Crude Types

May 29, 2014

Independent Statistics & Analysis
www.eia.gov

U.S. Department of Energy
Washington, DC 20585

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Preface

U.S. oil production has grown rapidly in recent years. U.S. Energy Information Administration (EIA) data, which reflect combined production of crude oil and lease condensate, show a rise from 5.7 million barrels per day (bbl/d) in 2011 to 7.4 million bbl/d in 2013. EIA's *Short-Term Energy Outlook (STEO)* projects continuing rapid production growth in 2014 and 2015, with forecast production in 2015 reaching 9.2 million bbl/d. Beyond 2015, EIA's *Annual Energy Outlook (AEO)* projects further production growth, although its pace and duration remain uncertain. Domestic production plateaus near 9.6 million bbl/d between 2017 and 2020, close to its historical high of 9.6 million bbl/d in 1970, in the AEO2014 Reference case. In the AEO2014 High Oil and Gas Resource case, growth continues through the 2020s and into the 2030s, with production reaching 13.3 million barrels per day in 2036.

Recent and forecast increases in domestic crude production have sparked discussion on the topic of how rising crude oil volumes will be absorbed. In early 2013, several commentators had suggested that near-term production growth would be threatened unless restrictions on U.S. exports of crude oil were significantly relaxed. EIA's perspective at the time was somewhat more nuanced, recognizing that relaxation of export restrictions was only one among several ways to absorb growing near-term flows of domestic production. (This Week In Petroleum, Absorbing increases in U.S. crude oil production, May 1, 2013)

Given the likelihood of continued growth in domestic crude production, and the recognition that some absorption options, such as like-for-like replacement of import streams, are inherently limited, the question of how a relaxation in current limitations on crude exports might affect domestic and international markets for both crude and products continues to hold great interest for policymakers, industry, and the public. In response to multiple requests, EIA is developing analyses that shed light on this question.

This paper provides a short-term forecast of domestic production by crude type, supplementing the overall production forecast provided in STEO. Forecasts of production by crude type matter for several reasons. First, U.S. crude streams vary widely in quality. Second, the economics surrounding various options for the domestic use of additional domestic oil production are directly dependent on crude quality characteristics. Third, actual or potential export values also vary significantly with quality characteristics.

The production forecast analysis of crude oil characteristics provided in this paper provides a starting point for further analyses of the market outlook and the effects of a possible relaxation of existing restrictions on crude oil exports.

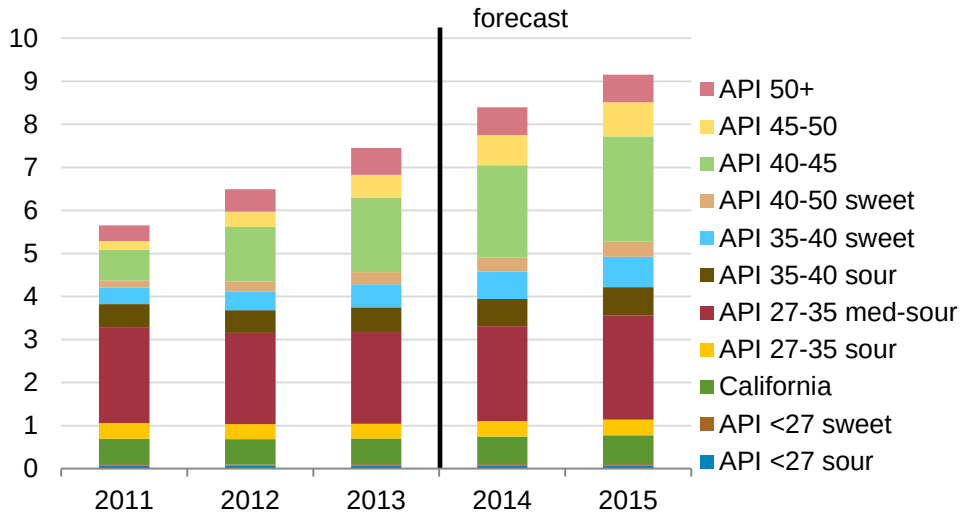
Summary Findings: Recent and Forecast U.S. Production by Crude Type

Recent U.S. crude oil production growth has consisted primarily of lighter, sweet crude (a description of crude quality, as measured by API gravity and sulfur content) from tight resource formations. Roughly 96% of the 1.8 million bbl/d growth in production between 2011 and 2013 consisted of sweet grades with API gravity of 40 or above.

EIA analysis of current and forecast crude oil production indicates that U.S. supply of lighter API gravity crude will continue to outpace that of medium and heavier crudes (Figure 1). More than 60% of EIA's forecast of production growth for 2014 and 2015 consists of sweet grades with API gravity of 40 or above.

Figure 1. U.S. crude oil production by crude type

million barrels per day



Source: EIA, DrillingInfo, Colorado DNR, Texas RRC.

The estimates presented in this paper reflect EIA's current assessment based on available data. The quality and timeliness of well-level data on production by crude type used to develop the estimates vary widely across states. As part of its continuing effort to improve data on oil and natural gas production, EIA is now seeking public comment on a plan to expand its current collection of monthly natural gas production data in 6 states to include both oil and natural gas production in 21 states. The proposed data collection, which EIA plans to launch in 2015, would provide information on production by crude type. Updated estimates of regional production by crude type will also be needed as new plays start commercial development, because production from new plays will change the distribution of production by crude types in the regions where those plays are located. (Federal Register Notice, http://www.eia.gov/pressroom/releases/press408.cfm)

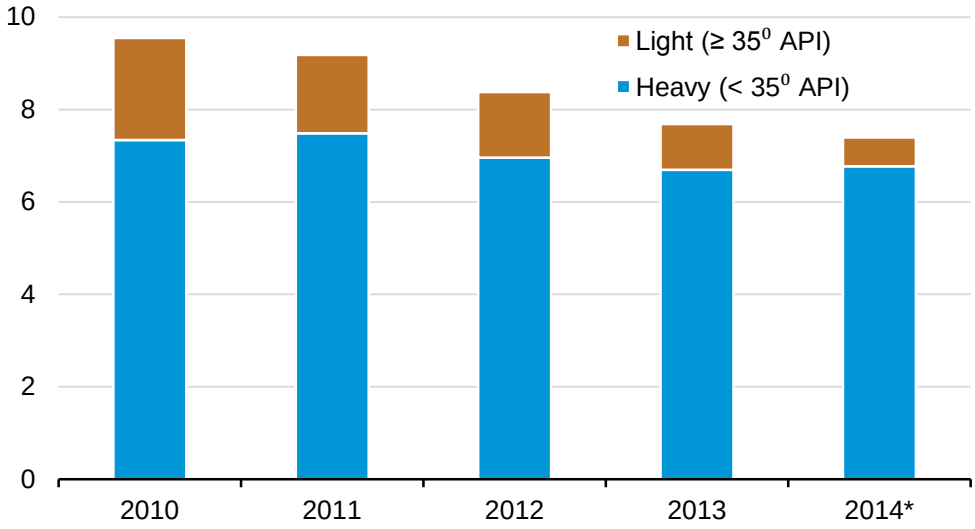
Although the topic of how future increases in domestic oil production might be absorbed into the market will be the topic of future analyses, data regarding recent experience along with brief qualitative insights regarding the future provide some important context.

Additional production of light oil over the past several years has for the most part been absorbed by reducing oil imports of similar grades. Of the total 1.5-million-bbl/d decline in crude oil imports between 2011 and 2013, nearly 50% was light crude (API gravity 35+). Light crude imports fell from 1.7 million bbl/d in 2011 to 1.0 million bbl/d in 2013. Light crude imports averaged only 0.6 million bbl/d during the first two months of 2014 (Figure 2).

Furthermore, of the total 1.5 million bbl/d decline in crude oil imports between 2011 and 2013, nearly 25% was lighter than 40 API gravity. These imports fell from 0.6 million bbl/d in 2011 to 0.2 million bbl/d in 2013. Lighter than API 40 gravity crude imports averaged only 0.1 million bbl/d during the first two months of 2014.

Figure 2. U.S. crude oil imports by crude type

million barrels per day



Note: 2014 data include January and February only.
Source: U.S. Energy Information Administration, Petroleum Supply Monthly.

Other responses to the additional production of light oil over the past several years have included additional crude exports, an increase in the average gravity of crude inputs to domestic refining, and increased refinery runs, given the recent cost advantage of U.S. refiners relative to global competitors:

- U.S. exports of crude oil increased from 47,000 bbl/d in 2011 to 120,000 bbl/d in 2013 and averaged 244,000 bbl/d in first-quarter 2014.
- The average API gravity of crude oil run at U.S. refineries increased from 30.2 degrees in 2008 to 30.7 degrees in 2011 and to 30.8 degrees in 2013.
- Utilization at U.S. refineries increased from 86.2% in 2011 to 88.3% in 2013.

The dwindling amount of light crude imports available to be backed out through further like-for-like substitution, and the limits to increased utilization of existing refinery capacity that is already running at high rates, could cause absorption of further increases in domestic production to rely heavily on some combination of the following:

- Continued shifts in the refinery input mix, which can be enabled by investments to relieve constraints associated with running lighter crudes at refineries that were optimized to run heavier ones
- Added splitters to convert light crude into a mix of heavier fractions to feed domestic refineries and light products valued in other markets
- Continued increases in crude oil exports, which will depend in part on the extent of any relaxation of current export restrictions

All of these options have implications for the value of existing refineries and specific refinery units, given the substantial investments that many domestic refiners have made since the 1990s in coking capacity designed to process heavy crude. They also have implications for the mix of products produced by the refining sector, as well as the market value of each type of crude input and refinery product output. A further adjustment mechanism, a change in crude production, would come into play in the event that the market value of a particular type of crude or lease condensate reaches a level where production is not economic.

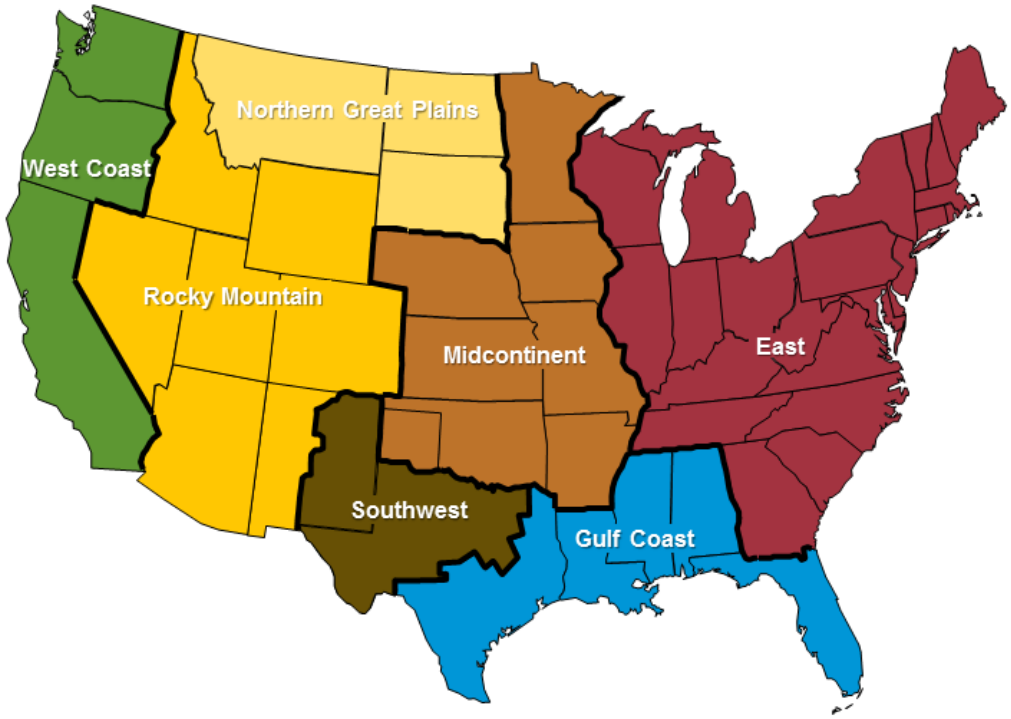
From the above discussion, it is evident that there are many issues for EIA to address in further analyses. But for now, we return to the focus of this paper by considering the forecast for crude production by type at the regional level.

Regional Analysis: Recent and Forecast Production by Crude Type

Regions and crude types

EIA analyzes U.S. crude oil production according to the regions shown on the map below. The producing regions are mapped to contain one or more hydrocarbon-producing geologic basins. In this paper, production is aggregated by crude types to regional totals.

Map 1. U.S. onshore lower-48 production regions

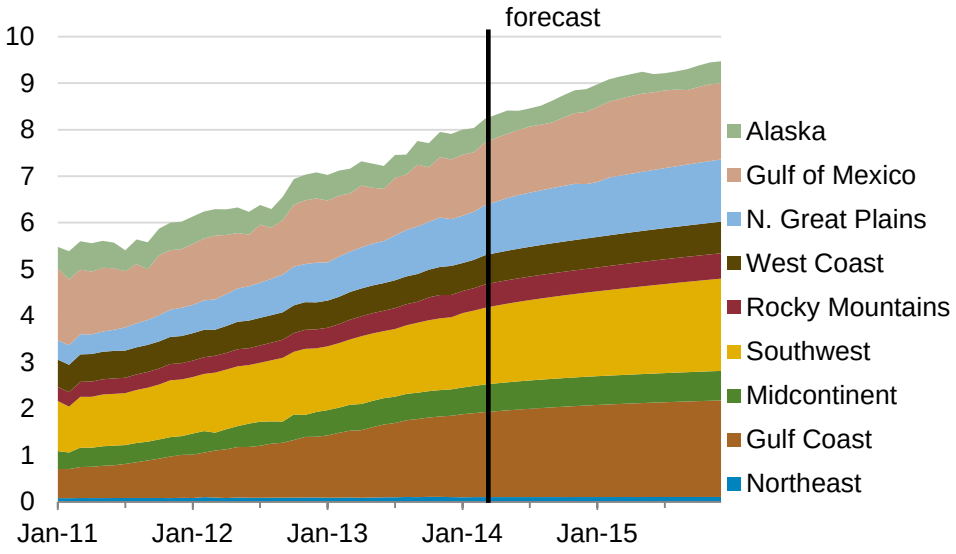


Source: EIA, Short-Term Energy Outlook.

In the May 2014 STEO, EIA forecast that U.S. crude oil production will grow from an average of 7.4 million barrels per day (bbl/d) in 2013 to 9.2 million bbl/d in 2015. The methodology for developing the forecast is explained in the February 2013 STEO Special Analysis article. Figure 3 below shows the regional components of the STEO crude oil production forecast.

Figure 3. U.S. crude oil production forecast

million barrels per day



Source: EIA, DrillingInfo.

There is no single standard classification scheme for grouping the large set of individual crude streams into a manageable number of categories for purposes of analysis. For this report, we categorized domestic production into 11 crude types. As shown in Table 1, the categories are based on API gravity ranges and sulfur content of produced oil. In some states where well-level data are available, crude oil production with API gravity between 40 and 50 can be separated into groups of API 40-45 and API 45-50, although sulfur content cannot be determined for these groups. Although additional API gravity data were not available for the Bakken, industry reports indicate that most Bakken wells produce relatively uniform quality crude oil between 40 and 45 degrees API gravity. The crude oil produced in California, primarily API<27 sour, is categorized separately because it is generally produced and refined in the same geographic region, and it is somewhat isolated from the heavy crude market dynamics of the rest of the country.

Data sources

Well-level production volumes are published by almost all states and are generally readily available, but the API gravity and sulfur content of that production are reported only by a few states. EIA has previously analyzed the characteristics of oil production at the basin level for the *Annual Energy Outlook*, and assigned crude types to production from different basins according to Table 1 below. In order to estimate the amount of production of different crude types for the STEO regional forecasts, the distribution of crude production from each region from the AEO2014 was applied to the STEO forecast for 2011 through 2015. Using well-level API gravity data where available – from the Railroad Commission of Texas for Eagle Ford and Permian production, and from the Colorado Department of Natural Resources for Niobrara production – Gulf Coast, Southwest, and Rocky Mountain regional production estimates were improved using data from wells completed as recently as March 2014.

Table 1. Crude oil types considered in this analysis

Chart Color	Crude Oil Type	API Gravity (degrees)	Sulfur Content (%)	a.k.a.
	API 50+	API>=50	<0.3	
	*API 45-50	45<=API<50	<0.3	
	*API 40-45	40<=API<45	<0.3	Light Sweet
	API 40-50 sweet	40<=API<50	<0.3	
	API 35-40 sweet	35<=API<40	<0.3	
	API 35-40 sour	35<=API<40	<1.1	Light Sour
	API 27-35 med-sour	27<=API<35	<1.1	Medium Medium Sour
	API 27-35 sour	27<=API<35	>=1.1	Medium Sour
	California	API<27	1.1-2.6	
	API<27 sweet	API<27	<1.1	Heavy Sweet
	API<27 sour	API<27	>=1.1	Heavy Sour

*Specified only where additional well-level API gravity data are available.

The quality and timeliness of well-level data on production by crude type used to develop the estimates vary widely across states. As part of its continuing effort to improve data on oil and natural gas production, EIA is now seeking public comment on a plan to expand its current collection of monthly natural gas production data in 6 states to include both oil and natural gas production in 21 states. The proposed data collection, which EIA plans to launch in 2015, would provide information on production by type. In addition to updates reflecting better data, updated estimates of regional production by crude type will likely be needed as new plays start commercial development. Production from new plays will change the distribution of production by crude types in the regions where those plays are located.

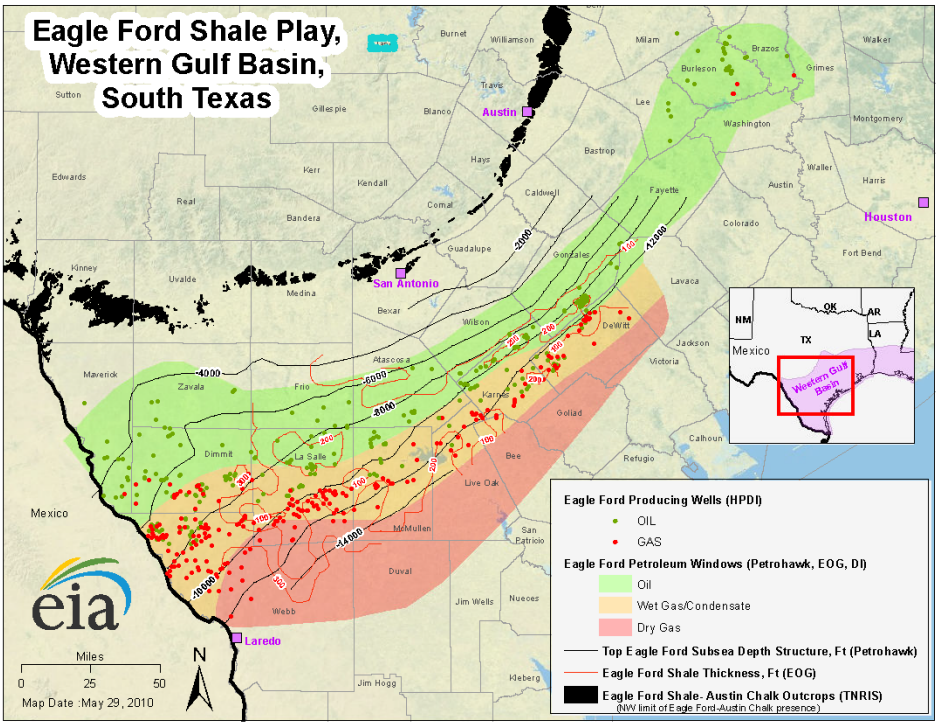
This paper estimates oil production by crude type as it would be delivered from well-site or lease storage tanks. Once the oil enters transportation and distribution systems, it may be commingled with other crude types (e.g., in rail cars or pipelines) or otherwise blended to capture economic opportunities before being delivered to the refinery. A simple example would be to blend relatively lower-value API<27 with API 50+ oil if the price of selling API 35-40 oil exceeded the cost of buying and blending the inputs. To the extent that such blending occurs, the volume of some crude oil types received by refineries would be different from those estimated from the well-level analysis in this paper.

A final point to consider involves the distinction between the very light grades of lease condensate (which are included in EIA's oil production data) and hydrocarbon gas liquids (HGL) that are produced from the wellhead as gas but are converted to liquids once separated from methane at a natural gas processing plant. These hydrocarbons include ethane, propane, butanes, and hydrocarbons with five or more carbon atoms – referred to as pentanes plus, naphtha, or plant condensate. Plant condensate can also be blended with crude oil, which would change both the distribution and total volume of oil received by refineries.

Eagle Ford and Gulf Coast: Recent and forecast production by crude type

The Eagle Ford is somewhat unique compared to other key oil-producing plays as there are three relatively distinct "windows" of the play. The formation becomes deeper moving from northwest to southeast, creating an oil window, a condensate window, and a dry gas window. Since 2010, producers in the Eagle Ford have moved steadily towards areas with more liquids, as prices have continued to favor oil over natural gas (see Today In Energy, February 10, 2014).

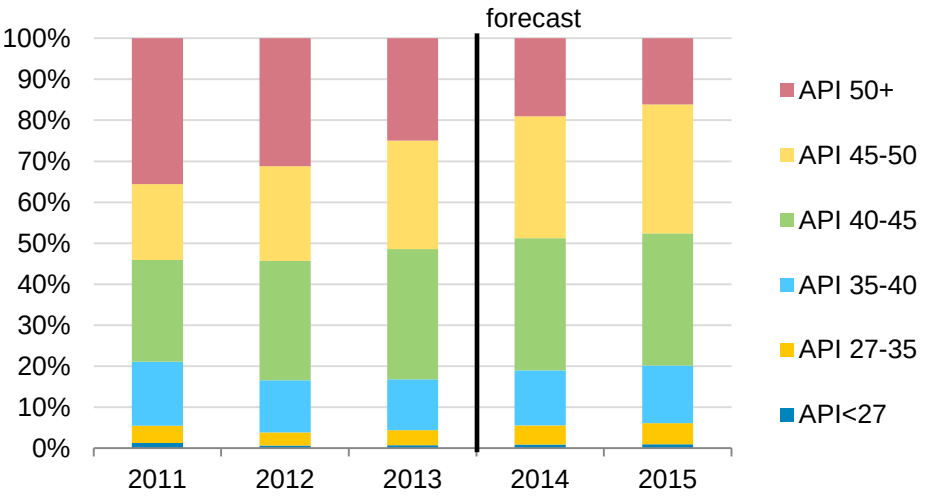
Map 2. Eagle Ford Shale Play



Source: EIA, http://www.eia.gov/oil_gas/rpd/shaleusa9.pdf.

This shift is also reflected in Figure 4, where a large percentage of Eagle Ford production in 2011 came from wells with reported API gravity greater than 50 degrees, but a greater share of the production growth in the subsequent two years came from new wells with reported API gravity between 40 and 50 degrees. The shift to producing oil rather than natural gas will continue in 2014 and 2015 based on the forecast for crude oil prices to remain high relative to natural gas prices.

Figure 4. Annual distribution of Eagle Ford production

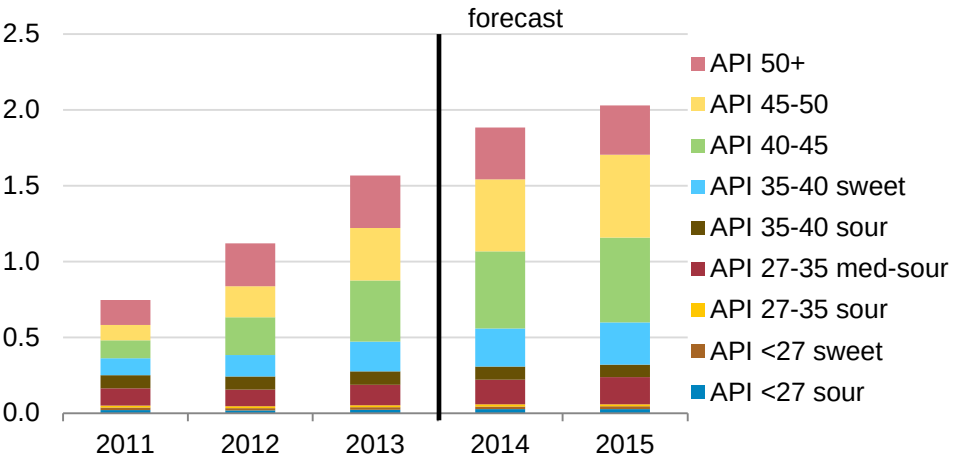


Source: EIA, DrillingInfo, Texas RRC.

Eagle Ford makes up nearly all the tight oil production in the Gulf Coast region. Adding in the residual tight oil production from Haynesville (approximately 50,000 bbl/d) and the stable non-tight Gulf Coast oil production (approximately 450,000 bbl/d), distributed into crude types by the *Annual Energy Outlook* projections, results in the total Gulf Coast production forecast shown in Figure 5.

Figure 5. Gulf Coast crude oil production by crude type

million barrels per day

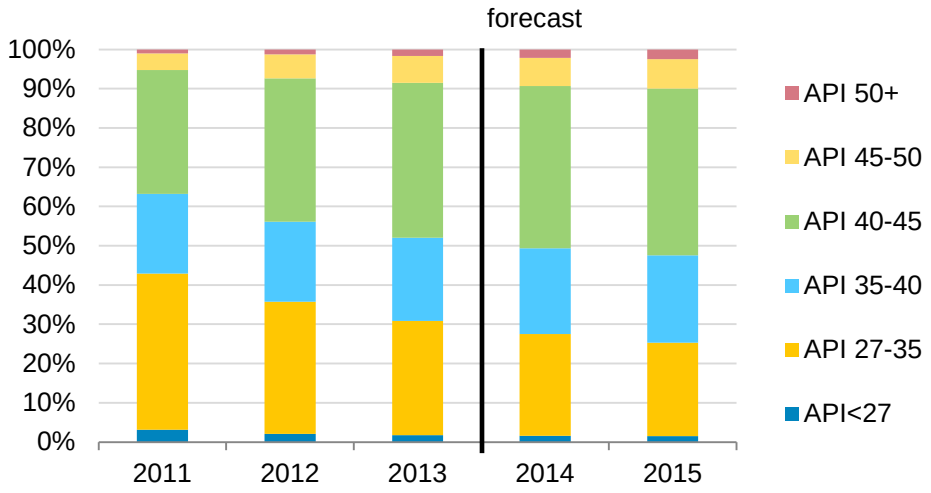


Source: EIA, DrillingInfo, Texas RRC.

Permian and Southwest: Recent and forecast production by crude type

Virtually all oil production in the Southwest region comes from the Permian basin. Permian oil production averaged 1.3 million bbl/d in 2013, compared to 100,000 bbl/d from the rest of the Southwest region. EIA analysis of Railroad Commission of Texas well records shows production by crude type changing rapidly, as new drilling in the basin increasingly targets the various stacked tight oil formations, rather than the conventional oil formations that have been developed for decades (Figure 6).

Figure 6. Annual distribution of Permian production

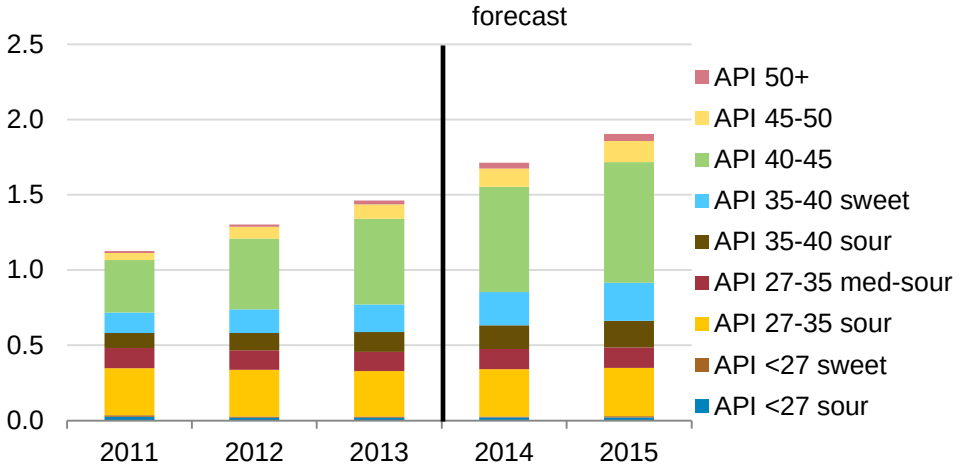


Source: EIA, DrillingInfo, Texas RRC.

EIA expects this trend to continue in 2014 and 2015, as Permian oil production is forecast to reach an annual average 1.8 million bbl/d in 2015, and other Southwest production is forecast to fall to 66,000 bbl/d in 2015, for a total of 1.9 million bbl/d oil production in the Southwest region (Figure 7).

Figure 7. Southwest crude oil production by crude type

million barrels per day

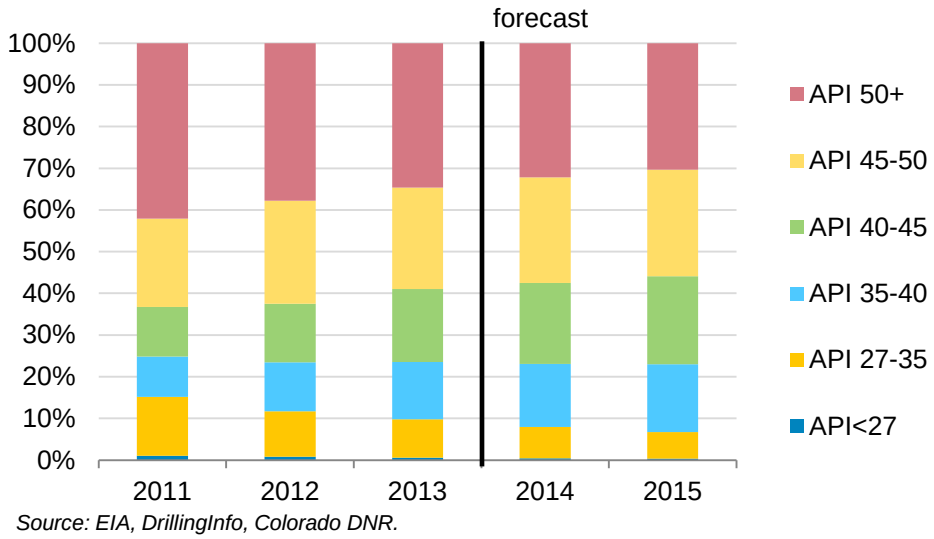


Source: EIA, DrillingInfo, Texas RRC.

Niobrara and Rocky Mountains: Recent and forecast production by crude type

The Rocky Mountains region is a significant producer of natural gas, although natural gas production has been declining in recent years as high oil prices and recent drilling success in the Niobrara formation have steered producers towards oil production. The distribution of Niobrara area oil production (Figure 8) reflects this, showing a significant but diminishing percentage of API 50+ production, which is commonly produced from wells targeting natural gas. Over the forecast period, production of oil with API gravity between 35 and 50 degrees expands to more than 60% of total oil production. Rocky Mountains oil production surpasses an average of 500,000 bbl/d in 2014 (Figure 9).

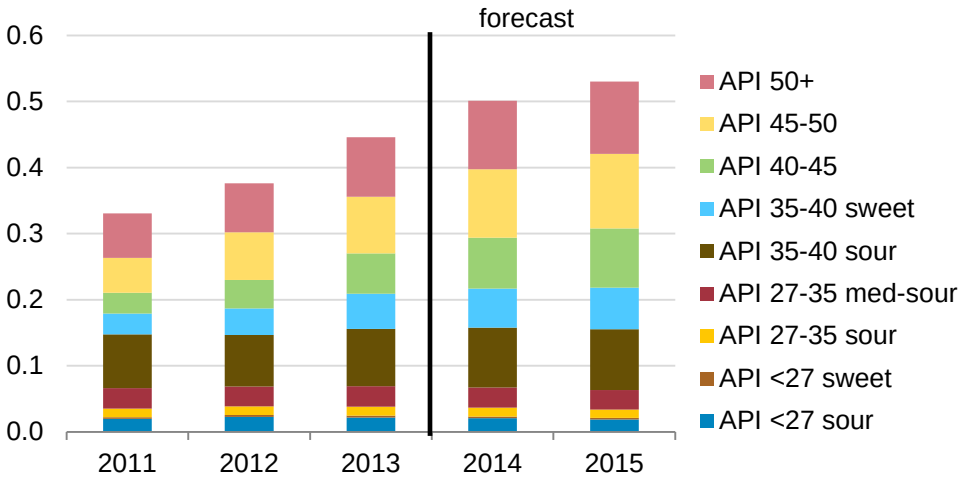
Figure 8. Annual distribution of Niobrara production



Source: EIA, DrillingInfo, Colorado DNR.

Figure 9. Rocky Mountains crude oil production by crude type

million barrels per day

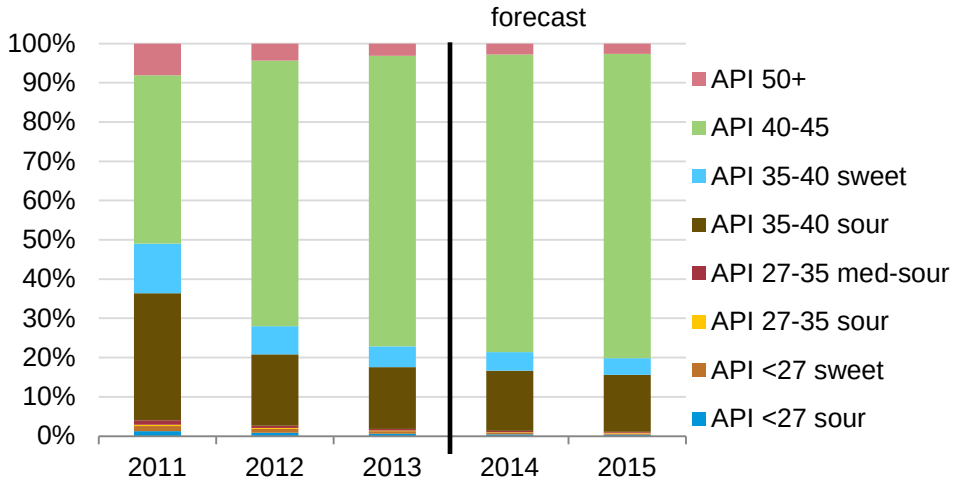


Source: EIA, DrillingInfo, Colorado DNR.

Northern Great Plains: recent and forecast production by crude type

Oil production growth in the Northern Great Plains region is expected to continue primarily from the Bakken. Although additional API gravity data were not available from the North Dakota Industrial Commission, industry reports indicate that Bakken crude oil consistently measures between 40 and 45 degrees API gravity. As such, the *Annual Energy Outlook* API 40-50 percentage of Northern Great Plains oil production was recategorized as API 40-45 for this analysis.

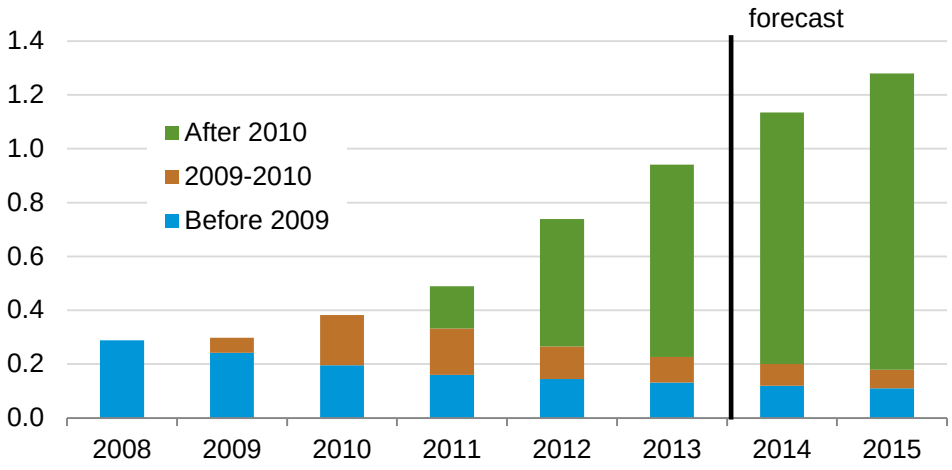
Figure 10. Annual distribution of Northern Great Plains production



Source: EIA, DrillingInfo.

Bakken oil production began increasing in 2009 and 2010, but there was nearly 300,000 bbl/d of legacy oil production from conventional reservoirs in the Northern Great Plains region. Figure 11, which shows oil production grouped by the year wells started producing, provides context to the distribution of oil production by crude type in Figure 10.

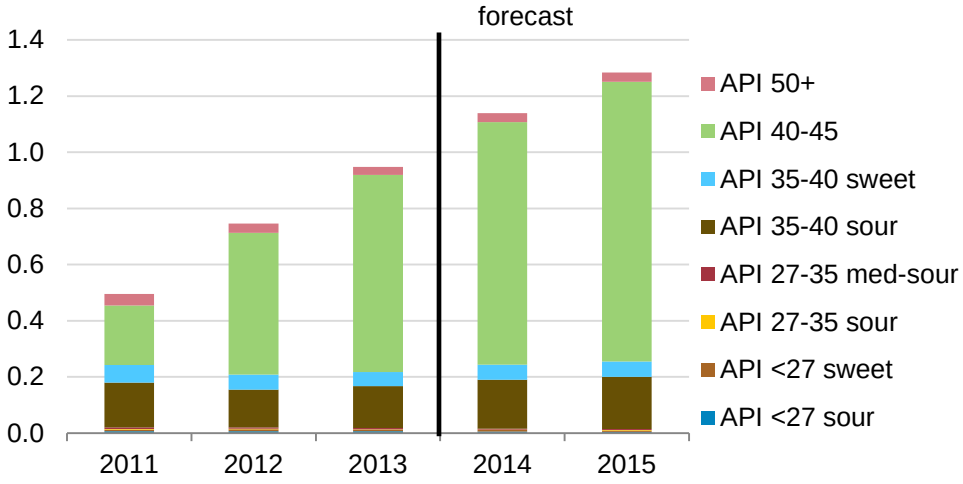
Figure 11. Northern Great Plains crude oil production by well start date



Source: EIA, DrillingInfo.

Northern Great Plains crude oil production is forecast to average 1.3 million bbl/d in 2015, almost 80% of which has API gravity between 40-45 degrees (Figure 12).

Figure 12. Northern Great Plains crude oil production by crude type

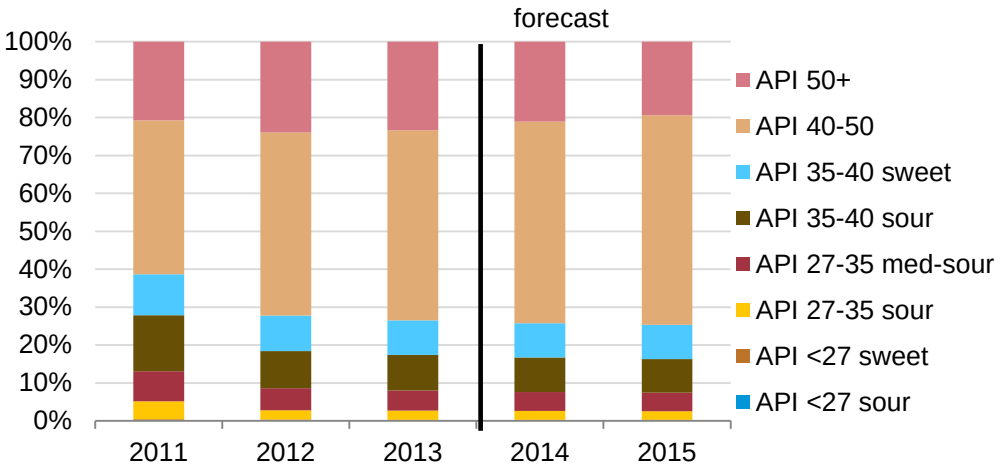


Source: EIA, DrillingInfo.

Midcontinent: Recent and forecast production by crude type

Well-level API gravity data from Oklahoma and Kansas were not available to examine the crude oil quality from formations such as the Granite Wash and Woodford. Based on the *Short-Term Energy Outlook* production forecast and the *Annual Energy Outlook* crude type distribution, Midcontinent crude oil production is forecast to increase from 560,000 bbl/d in 2013 to 625,000 bbl/d in 2015, with API gravity 40-50 crude oil making up 55% of the 2015 estimate (Figures 13 and 14).

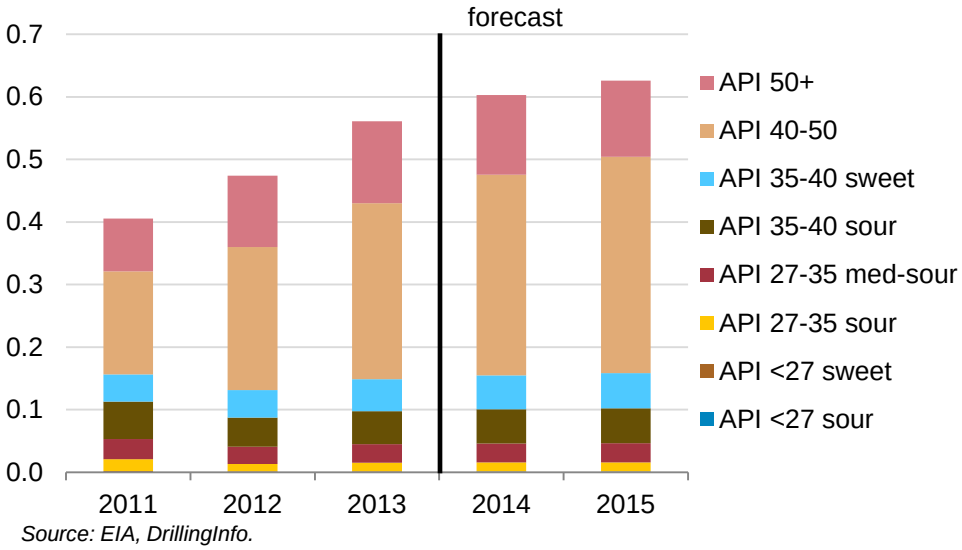
Figure 13. Annual distribution of Midcontinent production



Source: EIA, DrillingInfo.

Figure 14. Midcontinent crude oil production by crude type

million barrels per day



Source: EIA, DrillingInfo.

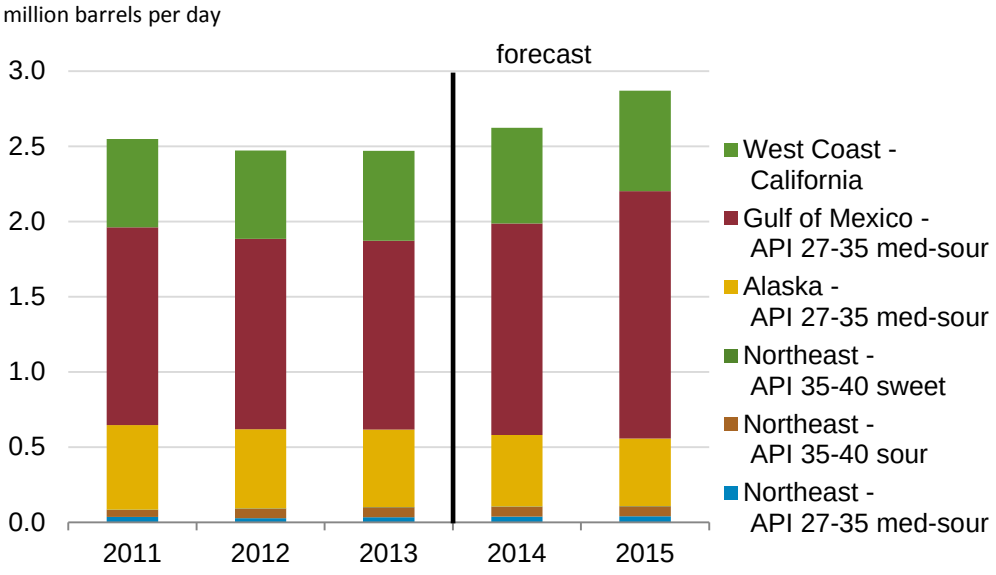
Alaska, Gulf of Mexico, Northeast, and West Coast: Recent and forecast production by crude type

In the *Annual Energy Outlook* crude type estimates, all Alaska and Gulf of Mexico oil production is assumed to be API gravity 27-35 degrees and medium sour. Northeast crude oil production consists of approximately 30% API 27-35 medium-sour and 60% API 35-40 sour. The residual production is API 35-40 sweet. West Coast region production, coming from California, is primarily API<27 sour. Per the "Regions and crude types" discussion above, California production is categorized by its own crude type.

Based on forecasts of annual average production from 2013 to 2015 in the *Short-Term Energy Outlook*:

- Alaska production declines from 515,000 bbl/d to 450,000 bbl/d
- Gulf of Mexico production increases from 1.3 million bbl/d to 1.6 million bbl/d
- Northeast production increases slightly from 100,000 bbl/d to 110,000 bbl/d
- West Coast production increases from 600,000 bbl/ to 670,000 bbl/d (Figure 15)

Figure 15. Alaska, Gulf of Mexico, Northeast, West Coast crude oil production



Source: EIA, DrillingInfo.

Attachment K3-4
Bristol, 2013. *Revision of Permit Condition 4336 Part 7; Phillips 66 Company, Rodeo Refinery, Facility #A0016*

Phillips 66
San Francisco Refinery
1380 San Pablo Avenue
Rodeo, CA 94572

July 31, 2013

ESDR-226-13
03-MT-02-A

Certified MAIL - 7011 2970 0000 0722 4316

Brian Lusher
BAAQMD
939 Ellis Street
San Francisco, CA 94109

Subject: Revision of Permit Condition 4336 Part 7
Phillips 66 Company, Rodeo Refinery, Facility #A0016

Mr. Lusher:

This application is a request to the Bay Area Air Quality Management District (BAAQMD) for a revision to the Major Facility Review (Title V) Permit issued to the Phillips 66 Company – San Francisco Refinery (Facility #A0016) to increase the limit contained in Permit Condition 4336 Part 7 (PC 4336-7) from 51,182 barrels per day (bbl/day) to 100,182 bbl/day on a 12-month rolling average basis.

Phillips 66 will pay all necessary permitting fees after a final invoice is received from the BAAQMD.

If you have any questions, please contact Brent Eastep at (510) 245-4672.

Sincerely,

Don Bristol
Environmental Superintendent

Attachment

Application for Authority to Construct
and Minor Modification to Major Facility Review Permit
Revision of Permit Condition 4336 Part 7
Phillips 66 San Francisco Refinery, Facility A0016

025608

INTRODUCTION

This application is a request to the Bay Area Air Quality Management District (BAAQMD) for an Authority to Construct and Minor Modification to the Major Facility Review (Title V) Permit issued to Phillips 66 Company – San Francisco Refinery (Facility #A0016). Permit Condition 4336 Part 7 (PC 4336-7) limits the amount of crude and gas oil that can be delivered to the refinery by tanker, ship or barge at the refinery's Marine Terminal. Phillips 66 is requesting an increase in the Marine Terminal (S425, S426) off-loading limit contained in PC 4336-7 by 49,000 barrels per day (bbl/d), from 51,182 bbl/day to 100,182 bbl/day on a 12-month rolling average basis. In addition, Phillips 66 is requesting that the limit on the number of ships and tankers that can deliver crude or gas oil be increased by 55 from 59 to 114 tankers or ships on a 12-month rolling average basis.

The refinery processes crude oil from central California received by pipeline and from a variety of domestic and foreign crude sources delivered by ship at the Marine Terminal. The proposed increase in the Marine Terminal off-loading limit would provide the facility with flexibility to process higher rates of waterborne crude and gas oil (replacing roughly equivalent volumes of pipeline crudes with waterborne crudes). Phillips 66 is not requesting any increases or modifications to currently permitted throughput or emissions limits at the refinery as a whole or at any downstream process units. No physical modifications are necessary for any existing process units or storage tanks. The proposed permit modification will not change or otherwise affect the types of crude oil that the refinery can process currently.

No modifications to refinery storage tank permit limits for throughput and/or emissions are requested in this application

DESCRIPTION OF AFFECTED SOURCES

This proposed project would increase the off-loading limit on crude and gas oil imports at the Marine Terminal by 49,000 bbl/d and 55 tanker or ship deliveries.

The increase in crude and gas oil volume would require an additional 55 marine tanker/ship trips a year to the Marine Terminal. The vessels would be accompanied by tugboats during the trip to and from the Marine Terminal.

The crude and gas oil delivered at the Marine Terminal are discharged from the vessels to the storage tanks at the refinery. The majority of the crude oil would be delivered to Tank

100 (S97), Tank 107 (S334), Tank 108 (S340) and Tank 109 (S439). Tank 100 is the main tank, which receives crude from the Marine Terminal. Tanks 107, 108 and 109 receive crude transferred from Tank 100 or directly from the vessels at the Marine Terminal. Tanks 107, 108 and 109 are then used to transfer crude to Tank 155 (S110) and Tank 156 (S111). Tanks 155 and 156 are the Unit 267 (S350) and Unit 200 (S300) crude unit feed tanks, respectively. Tanks 155 and 156 receive crude from both the Marine Terminal and the pipeline to provide feed for the crude units.

Gas oil, which is a Regulation 8-5 exempt material, received at the Marine Terminal would normally be delivered to Tank 280 (S173) and Tank 281 (S174). In certain situations, the gas oil could be transferred to other tanks, as necessary. Tanks 280 and 281 are fixed-roof, natural gas-blanketed tanks that are controlled by the vapor recovery system (A7). These tanks are used to feed the Unit 246 Hydrocracker (S434).

None of the crude or gas oil storage tanks will require an increase in permitted throughput limits as a result of the proposed increase in crude or gas oil delivered via the Marine Terminal.

All process units that would receive crude or gas oil delivered via the Marine Terminal currently have throughput limits in the Title V Permit. The proposed increase to the off-loading limit at the Marine Terminal will not require any increase in existing throughput limits at any downstream process unit.

Crude Units 200 and 267 can process a variety of crude oil types. Unit 200 typically processes a heavy crude oil from the San Joaquin Valley. Unit 267 typically processes a crude blend from California, Alaska and a variety of foreign sources. The current processing ability of these units will not be modified by this permit application as no physical facilities or permit changes for these units are being made.

This application requests changes to the crude and gas oil throughput limit only for the Marine Terminal. No changes are requested for any other emission source at the refinery, and no other refinery sources are "modified" in connection with this application.

In particular, the refinery fuel gas system and sources burning refinery fuel gas are neither "modified" nor "altered." District Regulation 2-1-234.2 defines a "modified source" as "any existing source that undergoes a physical change, change in method of operation, increase in throughput or production, or addition and that results or may … increase emissions of any pollutant above levels contained in a permit condition in any current permit to operate or major facility review permit". The fuel gas system and associated heaters are entirely separate from the Marine Terminal and are unaffected by changes in throughput as total refinery throughput is unchanged. The refinery has numerous existing SO_2 related limits on specific combustion sources, such as the fuel gas system and associated heaters, and a refinery-wide SO_2 cap established in an NSR permit in 1988. No changes are being requested to allow an emission increase above these existing permit limits. Therefore, the fuel gas system and associated heaters are not being "modified" as that term is used in District Regulation 2-1-234.2.

Moreover, neither the fuel gas system nor refinery process units would be "altered" by any change in crude slate that may result from the requested Marine Terminal throughput increase. District Regulation 2-1-233 defines "alter" as a physical change or change in the method of operation "which may affect emissions." However, a "change in process stream composition is not an alteration if the source's description in the permit and permit conditions allow for the change in process stream composition, and the change does not increase emissions beyond permitted levels." Crude oil is a mixture of hydrocarbons that, by definition, is variable. No two crude oils are exactly the same, and even those that come from the same region or field can and will vary. The refinery has historically processed a variety of crudes, arriving via pipeline or the Marine Terminal, that meet the design requirements of the processing units. The Rodeo Refinery does not have any limits or restrictions on the characteristics of the crude oil processed at the refinery (i.e., the "process stream") other than the Unit 267 sulfur limit described below, and all emissions will remain within permitted levels. The crude processing Unit 267 has a sulfur limit in the crude processed at that unit of 1.5 wt %. This limit will still be in the permit and will not be affected by the permit application. Although a larger proportion of the crudes may be waterborne as a result of the proposed project, the variety of crudes processed will still meet the limitation and design criteria of the equipment currently present at the refinery. No physical modifications will be made to any process units as part of this project. Therefore, the fuel gas system and associated heaters are not being "altered" as that term is used in District Regulation 2-1-233.

Finally, as shown in Figure 1, monthly values of the sulfur content in refinery fuel gas and crude from 2004 through August, 2011 demonstrate that there is no correlation between fuel gas sulfur content and the sulfur content in the crude oil.

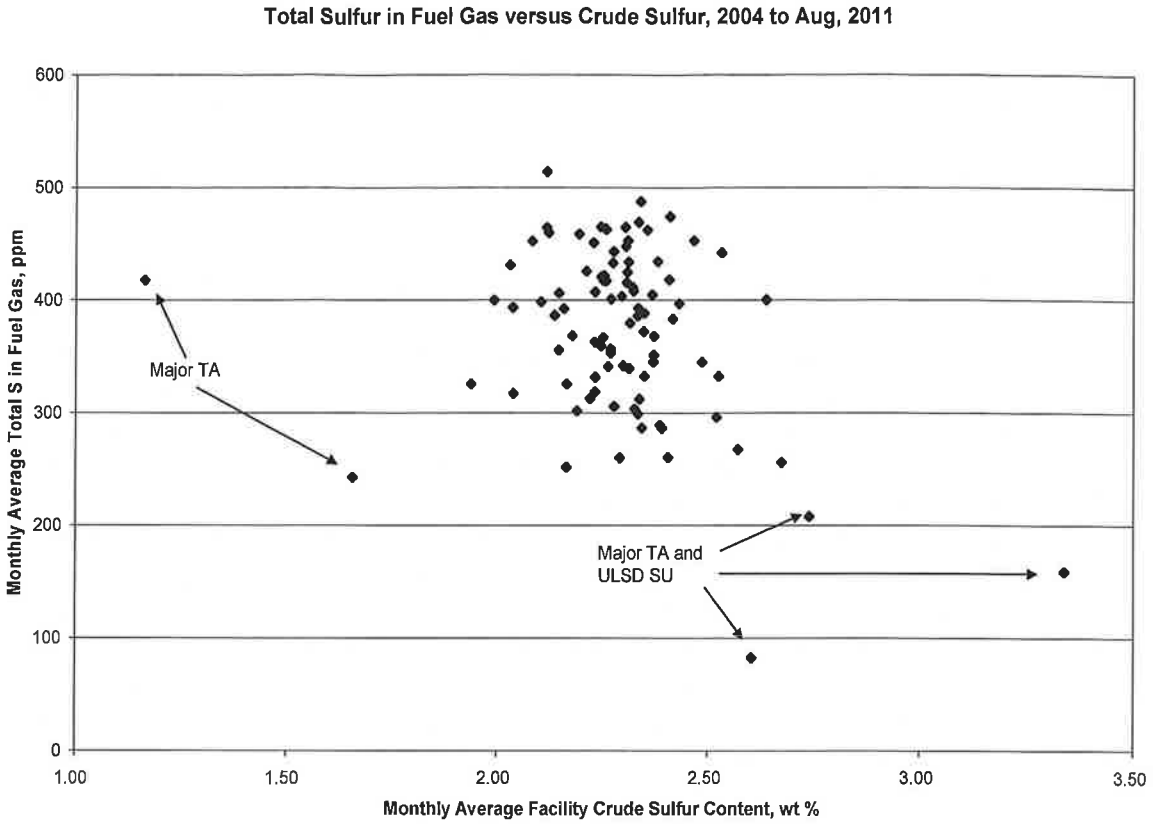


Figure 1.

ESTIMATED EMISSIONS

Emission changes from this proposal would result from an increase in the number of marine vessels and associated tug boats when at the wharf, and an increase in the number of marine vessels in transit in BAAQMD waters. As discussed in the applicable requirements section, emissions from the marine vessels and associated tug boats are not subject to District BACT requirements and are not included when determining PSD applicability. Phillips 66 will submit a detailed emissions estimate in a separate submittal.

APPLICABLE REQUIREMENTS

Prior to issuing an ATC or PTO, the BAAQMD must determine if a proposed project complies with BAAQMD, state, and federal requirements. This section discusses key requirements that apply to the proposed project.

Best Available Control Technology (BACT)

BACT requirements specified in Regulation 2-2 (New Source Review) apply to sources that have the potential to emit 10 pounds per highest day or more on a pollutant by pollutant basis.

Vessels are mobile sources that are not subject to the District's BACT requirement. See Rule 2-2-206. BACT for marine vessels is not included in the District's BACT/TBACT Workbook, U.S. EPA's RBLC website or the ARB's BACT Clearinghouse. All vessels entering California State waters must comply with fuel sulfur limits and all applicable maritime requirements.

Emission Offsets

As required by Regulation 2-2, offsets will be provided for the emissions increases estimated for this project. Offsets will be provided at the ratio required by Regulation 2-2.

Prevention of Significant Deterioration (PSD)

The proposed project is exempt from the PSD requirements in Regulation 2-2. Per Regulation 2-2-215, the emissions from the marine vessels are not included when determining applicability with the PSD emission thresholds. The only emission increases are from the marine vessels, therefore PSD is not applicable because the emission increase is zero.

As described above, the fuel gas system and associated heaters are sources separate from the Marine Terminal. The refinery has a number of existing SO_2 related limits on specific combustion sources, such as the fuel gas system and associated heaters, and a refinery-wide SO_2 cap established in an NSR permit in 1988. No changes are being requested to allow an emission increase above these existing permit limits. The fuel gas system and associated heaters are not being "modified" as that term is used in District Regulation 2-1-234.2 and, therefore, do not meet the Major Modification definition in Regulation 2-2-221.

California Environmental Quality Act (CEQA) Review

The proposed project is not ministerial, nor does it qualify for any categorical exemption from CEQA. Because no other discretionary permits are required for this project, the BAAQMD will be the Lead Agency under CEQA.

Phillips 66 will submit a CEQA Applicability document in a separate submittal which the BAAQMD can use as the basis for an Initial Study for CEQA.

New Source Review of Toxic Air Contaminants (TACs)

Regulation 2 Rule 5 requires a health risk screening analysis (HRSA) for any project that exceeds the toxic trigger levels in Regulation 2-5. Although emission estimates have not been finalized, it is likely that an HRSA will be required. Phillips 66 will submit a completed HRSA to the BAAQMD in a separate submittal.

Major Facility Review (Title V) Permit

Phillips 66 requests that this application be processed as a minor modification to the Title V permit as defined in Regulation 2-6. The proposed project does not meet any of the criteria for a significant permit revision in Regulation 2-6-226. It is not considered a major modification under any federal rules listed in Regulation 2-6-226.1 or 226.2 and does not relax or change any monitoring, reporting or recordkeeping.

Attachment K3-5
Feedstock Quality Data for Diluted Bitumen ('Dilbit') Oils

Attachment K3–5. Feedstock quality data for diluted bitumen ('dilbit') oils.

Dilbits	WCS	AWB	BHB	CDB	CL	KDB	Average
Whole crude							
Density (kg/m^3)	929	923	925	924	928	927	926
Sulfur wt. %	3.5%	3.9%	3.7%	3.9%	3.8%	3.9%	3.8%
Distillation vol. fraction							
Naphtha IBP–190C	0.197	0.279	0.276	0.274	0.230	0.246	0.250
Distillate 190–343C	0.174	0.113	0.107	0.123	0.152	0.122	0.132
Gas oil 343–527C	0.263	0.237	0.247	0.246	0.226	0.242	0.244
Resid 527+ ºC	0.366	0.371	0.369	0.356	0.392	0.390	0.374
Cuts density (kg/m^3)							
Naphtha IBP–190C	690	688	681	687	688	672	684
Distillate 190–343C	880	882	892	880	883	892	885
Gas oil 343–527C	955	964	976	964	958	966	964
Resid 527+ ºC	1,055	1,062	1,061	1,059	1,052	1,039	1,055
Cuts sulfur (wt. %)							
Naphtha IBP–190C	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	ND	<0.1%
Distillate 190–343C	1.3%	1.4%	1.5%	1.3%	1.6%	1.5%	1.4%
Gas oil 343–527C	2.9%	3.5%	3.6%	3.3%	3.3%	3.5%	3.4%
Resid 527+ ºC	5.6%	6.5%	6.5%	6.2%	6.3%	6.0%	6.2%

Notes: Data shown were reported publicly by the Canadian oil industry (www.crudemonitor.ca; downloaded Dec 2014) for these crude streams, which are commercially available to US refiners. Dilbits, shown in the table by their acronyms, are: Western Canadian Select (WCS), Access Western Blend (AWB), Borealis Heavy Blend (BHB), Christina Dilbit Blend (CDB), Cold Lake (CL), and Kearl Lake (KDB). Data for distillation cuts are averages of the two most recent assays for each stream reported, where available; data for whole crude are averages for the most recent five-year period reported.